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ORIGINAL ARTICLES.

THE RESULTS OF THE TREATMENT OF FORTY CASES OF DIPHTHERIA WITH THE ANTITOXIN.

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[From the Pathological Laboratory of the Western Reserve University.]

IN December last, in Ashtabula, Ohio, there was a sudden and widespread epidemic of diphtheria. From the 5th to the 13th of the month there were reported at the Health Office 63 cases of diphtheria with 17 deaths, or a mortality of about 27 per cent. Besides the fatal cases there were on the 13th a number of patients desperately ill and looked upon as entirely hopeless. The inhabitants were panic-stricken, and the Health Board determined to try to check the epidemic by the employment of the antitoxin. With this object in view, and as an experiment, Dr. A. W. Hopkins, the local officer of health, obtained a dozen bottles of antitoxin from the New York Biological and Vaccinal Institute, for use in the most desperate cases. I was asked to take charge of the administration of the remedy and to keep records of the observations made. In all the cases seen by me (25), cultures were made from the throats before the treatment was begun. On December 16th treatment was commenced with three of the most desperate cases (Nos. XXXIII, XXXVIII, and XXXIX). Two of these showed marked improvement in a short time; Case XXXVIII died on the third day. All three cases were well advanced in the disease; two, five days, and one, six days. About the same time the antitoxin was given with marked benefit to some less severe cases. Encouraged by these results the Health Board kept a constant supply of the antitoxin on hand, which was placed at the disposal of any physician who wished to use it. The only restrictions were that I should be present to represent the health officer and to make cultures from the throats of the patients treated. It was a matter of routine in the houses in which cases were treated with the antitoxin to give immunizing doses to the other members of the household. Following these measures there was not only a striking lowering of the mortality in the diphtheria-cases, but the number of cases in the infected houses rapidly diminished.

In all I have records of 40 cases of diphtheria treated with the antitoxin in Ashtabula. Twenty-five of these cases I saw personally with the attending physicians; the histories of the remaining cases have been furnished me by the physicians. In some instances they have completed my records from their own notes. The following physicians had charge of the cases: Dr. Aldrich 11, Dr. Dickson 3, Dr. Dorman 1, Dr. Flower 17, Dr. Gilchrist 3, Dr. Hopkins 1, Dr. Morse 3, Dr. Pardee 1. I take this opportunity of expressing to these gentlemen my thanks for their uniform kindness and courtesy to me.

The cases, for convenience of study, may be divided into mild (8), of medium severity (14), severe (10), malignant (8).

In the forty cases cultures were made from the throats in 29; in these the bacillus diphtheriæ was found alone in 20, the bacillus diphtheriæ and the staphylococcus aureus in 5, and the bacillus diphtheriæ and the staphylococcus aureus and the streptococcus pyogenes in 3. In one undoubted case of diphtheria (Case No. XXXIV) the bacillus diphtheriæ failed to develop. Of the 25 cases which I saw and made cultures from, the bacillus diphtheriæ was found in all. Of the 40 cases 3 died, a mortality of about 7.5 per cent. Of the mild cases the youngest was three years and the oldest twelve years, with an average age of 7.2 years. In 5 of these the treatment was begun within twelve hours from the onset of the disease, in 2 within twenty-four hours, and in 1 on the second day. Of the 14 cases of medium severity the youngest was 4.5 years, the oldest twenty-seven years, with an average age of ten years. Ten were under fifteen years. Of these 14 cases, in 11 the treatment was begun on the first day of the disease, in 2 on the second day, and in 1 on the fifth day. Of the 10 severe cases the youngest was 4.5 years, the oldest forty-three years, with an average age of 22.8 years. Six were treated on the first day, 2 on the third, 1 on the fourth, and 1 on the fifth day; average 2.1 days. Of the 8 malignant cases the youngest was four months, the oldest twenty-seven years; the average age was fifteen years. In 2 the treatment was begun on the second day (all recovered), in 1 on the third day (recovery), in 1 on the fourth (death), 1 on the fifth (recovery), and in 2 on the sixth (death in both); average 3.75 days. An analysis of all the cases taken together shows that the treatment was

begun on the first day in 19, on the second day in 6, on the third day in 3, on the fourth day in 2, on the fifth day in 3, and on the sixth day in 2.

Dosage. From the beginning the size of the dose given varied with the severity of the attack. The initial dose was usually the contents of one of the bottles, from 23 to 25 c.cm.¹ The mild cases, however, each received only from 15 to 20 c.cm. in all. In 4 of these latter cases the whole amount received was given at once, while in the rest it was given in two doses. These cases were treated so early in the disease that these comparatively small doses sufficed.

After the initial dose the size and frequency of the succeeding doses were regulated almost entirely by the severity and the seeming demands of the case, but in some instances it was limited by the supply of the antitoxin on hand. In several of the first cases we would have given larger and more frequent doses but for a temporary lack of the remedy. Several cases undoubtedly suffered on this account. It was very interesting to watch them improve to a certain degree, with the general condition markedly improved and the false membrane checked or even separating, and then on withholding the remedy, on account of the lack of it or on account of faulty judgment in some cases, to observe the return of the prostration and the reformation and spreading of the false membrane. On again exhibiting the antitoxin these cases would show rapid improvement. As will be seen later, we found the condition of the pulse and the appearance of the false membrane the best guides for the dosage. The smallest amount given in any case for treatment was 15 c.cm., the largest 113 c.cm. The mild cases received 16 c.cm. as an average dose. Cases of medium severity received from 20 to 55 c.cm., the average being 38 c.cm. The severe cases received from 23 to 70 c.cm., the average being 50.7 c.cm. The malignant cases received from 17 to 113 c.cm. Leaving out the case receiving 17 c.cm. (an infant of four months), the average amount received by this class was 71 c.cm. In looking back upon our experience I am confident that some cases, although they recovered and did well, received less than was good for them.

Mode of administration. The remedy was given by means of a large (25 c.cm. capacity) hypodermic syringe, which was sterilized before and after use by washing with a 5 per cent. solution of carbolic acid. Several parts of the body were tried as places for the injections. We found by experience that the soft pad of the buttock was the best place. Not only was the pain less here, but the serum was absorbed

from this point very much more quickly than from any other place tried. If the skin is stretched taut with the thumb and the index and middle fingers of the left hand, and the needle of the syringe is plunged quickly through the skin there is little or no pain. Indeed, young children, if they are ignorant of what is about to be done, scarcely wince when the needle is passed through the skin. At the first plunge, the needle, with the patient lying on the back or on the opposite side, should not go more than from 1 to 1.5 cm. into the tissues; after this the needle can be slowly pushed in without giving rise to pain in any direction, and as deeply as necessary. The injection should be made slowly. When these precautions are taken practically no pain is experienced. The tissues are so soft and loose in this region that the fluid is rapidly absorbed and gives rise to little bulging of the part. We repeatedly gave patients a number of injections in the same buttock without discomfort or ill effects.

An accident was met with in only one case. This was in a thin child, who, knowing what was about to be done, jumped toward the needle as it was plunged in. The point of the needle hit the bone and the needle broke off half-way between the point and the shank. About two weeks later the needle was felt under the skin and was readily removed. Even in this case there was no inflammatory reaction. With the large number of injections made we have not had a single case of infection.

Effects. The earliest and one of the most striking and characteristic effects met with following the injections of the antitoxin were on the pulse. These were best observed in the severe and malignant cases on account of the extremes. We have repeatedly observed a decided rise in the arterial tension within fifteen minutes after an injection. This, however, was not constant. But we could nearly always note a slowing of the pulse-rate in from ten to fifteen minutes after an injection. Frequently, even in very severe cases, the pulse-rate would fall from five to ten beats per minute. In from six to twelve hours it was frequently observed to fall twenty or more beats per minute. In from twenty-four to forty-eight hours the pulse was usually down to 80 or 90. Corresponding with this fall in the pulse-rate there would be a marked increase in the strength of the pulse with a rise in the arterial tone. The heart-sounds always became louder and stronger after the injections. In several cases, cyanotic at the commencement of the treatment, the cyanosis cleared up in a remarkable way. This was especially striking in Case XXXVIII. The effect upon the heart was apparently not entirely explained by the antitoxic action of the remedy.

Temperature. There was usually a decided fall in the body-temperature in from twenty-four to forty-eight hours after the treatment was instituted. In

¹ The strength of a sample of the antitoxin used was tested on guinea-pigs in my laboratory by Dr. Clarence O. Arey. According to his experiments, it had an antitoxic value of 1 to 50,000, or contained about 60 antitoxin units to the cubic centimeter. This is about the strength of Behring's No. 1.

some cases this was marked and rapid, in others gradual.

Respirations. No changes attributable to the remedy itself were noted in regard to the respirations.

False membrane. Within the first twelve or twenty-four hours there was very little, if any, change noted in the appearance of the false membrane. In the severe cases it would often increase somewhat during this time. But usually at the end of twenty-four hours, and nearly always after forty-eight hours, decided changes were noted. In the first place the formation of the membrane ceased. Then the previously dry, opaque, dirty-gray membrane became moist, somewhat translucent, and milky or pearly-white in appearance. After this it began to curl up and loosen at the edges. When the false membrane was thick and piled up, frequently large masses separated from the surface and were coughed up. Although this was often noted, the chief and most constant point of separation seemed to be at the surface or border between the false membrane and the mucous membrane of the part. Thin, filmy false membranes, which were not infrequently noted extending from the uvula over the roof of the mouth, would often fade away in a few hours, often before the thicker, denser, older portion showed any changes at all. Of the mild cases the false membrane had entirely disappeared in 1 at the end of twenty-four hours, in 6 in two days, and in 1 in three days. In the cases of medium severity it disappeared in 4 on the second day, in 4 on the third day, in 3 on the fourth day, in 2 on the fifth day, and in 1 on the sixth day; an average of 3.5 days. In the severe cases it disappeared in 1 on the second day, in 1 on the third day, in 5 on the fourth day, in 2 on the fifth day, and in 1 on the seventh day; an average of 4.7 days. In the malignant cases it disappeared in 1 on the third day, in 1 on the fourth day, in 2 on the fifth day, in 2 on the sixth day, and in 1 on the seventh day. One case died without the disappearance of the false membrane, although it had decreased. After the disappearance of the false membrane from the throat the affected part healed very rapidly. It was noticed by all who saw the patients that the appearance of the affected surface was much better in the cases treated with the antitoxin than in the cases in which it was not used.

Effects on the general condition. Usually within twelve hours, and nearly always within twenty-four hours, there was a marked improvement in the general condition. Patients much prostrated before would in this time express themselves as feeling very much better. It was not uncommon to see patients, even in the severe and malignant cases, sitting up in bed twenty-four or forty-eight hours after the treatment was begun. They not infrequently said that they felt stronger after the injections. Patients

would often appear bright and cheerful long before the separation of the false membrane. In none of the mild cases were there any after-effects attributable to the antitoxin. Of the cases of medium severity 1 (XXI) had simple urticaria four days after the disappearance of the false membrane; 2 (XIX and XX) had urticaria and swelling of the joints and of the inguinal glands. Of the severe cases three had urticaria. One of these had a very severe attack of urticaria, with painful swelling of the inguinal glands (Case XXIX), and another (Case XXXII) had urticaria, with severe muscular soreness and slight dimness of vision. Of the malignant cases two had urticaria and one had painful and swollen joints. In all of these cases the swelling of the joints, the muscular soreness, and the glandular enlargement disappeared in a few days, and the patients made complete recoveries. In some of them the pain was distressing. These symptoms seemed to have no special relation to the amount of the antitoxin given.

Complications. It is of especial interest to note that of the forty cases treated with the antitoxin only one developed paralysis. This was a malignant case treated on the sixth day of the disease (Case XXXIII), in which some weeks after the disappearance of the false membrane paralysis of the pharynx and of the lower extremities developed. The patient has completely recovered. A large proportion of the cases in which the antitoxin was not used had marked paralysis. In a number of the fatal cases not treated with the antitoxin death was referable to failure of the heart. In only three of the cases treated with the antitoxin were there any heart-symptoms. Two had slight cardiac irregularity and some dyspnea for several weeks and then entirely recovered. The third case (XXXIX) died of acute dilatation of the heart. In this case the antitoxin-treatment was begun on the sixth day. Although the patient was very ill, it was thought that she would recover. This patient received the largest amount of antitoxin given, 113 c.cm. It is evident that her heart was extensively damaged before the treatment was begun (she was cyanotic at the time of the first injection), or that we did not administer enough of the remedy. Hers was one of the first cases. It was not found possible to obtain records of accurate urinary examinations, which is to be deplored. In two of the cases in which urinary examinations were recorded a small amount of albumin was found. In both cases this was transient, and complete recovery followed. In none of the cases were there clinical symptoms referable to the kidneys. In nine of the twenty-nine cases in which a bacteriologic examination was made mixed infection was present. The streptococcus was present in only three of these.

The other two fatal cases are of interest. One

was in a boy six years of age, with diphtheria of the nose, pharynx, tonsils, uvula, roof of the mouth, and larynx. He showed improvement for two days. Twelve hours before death he was intubated, with but little relief. He was treated on the sixth day, and died with pneumonia. He had had measles two weeks before the appearance of the diphtheria. He was the first case treated with the antitoxin. While the case was apparently hopeless, I am now confident, in the light of our subsequent experience, that he did not receive nearly enough antitoxin, and was probably not given a fair chance. The last fatal case was an infant four months old, treated on the fourth day of the disease. It showed decided improvement, but died several days after the disappearance of the false membrane, apparently of septicemia. From the throat of this case, in addition to the bacillus diphtheriae, there were large numbers of the staphylococcus pyogenes aureus. In two of the fatal cases there was mixed infection.

In the forty cases reported there is a mortality of only 7.5 per cent. If the two fatal cases treated on the sixth day are excluded, the mortality sinks to 2.5 per cent. Besides the forty cases here reported there have been treated in Ashtabula at least ten or fifteen more without a death.¹ In none of these cases, however, was a bacteriologic examination made, and no notes of them have been sent me. It is very probable that they were all true diphtheria. Among them there were some very severe cases. It is probable, then, that my statistics fall short of giving the best results obtained in Ashtabula in the treatment of diphtheria with the antitoxin. From the beginning of the epidemic on December 5, 1894, to January 1, 1895, there were reported at the Health Office (exclusive of the cases treated with the antitoxin) eighty-two cases of diphtheria with twenty deaths, a mortality of 24 per cent. The majority of these cases were examined bacteriologically by me, and the bacillus diphtheriae was found in every case examined.

The Ashtabula epidemic is especially well adapted for a study of the comparative value of the antitoxin-treatment of diphtheria and the ordinary methods of treatment. The majority of the individuals affected were under very much the same conditions. They almost invariably sent for a physician on the first or second day of the disease. Their surroundings were in the main good, and the large proportion of the persons affected lived in good houses and were not crowded. Our experiences are in striking contrast for these reasons with those met in large city hospitals, drawing their cases from large tenement-

houses and with their late admissions. To these circumstances, apparently, is to be attributed our relatively low death-rate in both classes of cases, 24 per cent. in those treated by ordinary methods and 7.5 per cent. in those treated with the antitoxin. Those of our cases coming under treatment after the third or fourth day had received a variety of local applications. In the majority of cases they had been treated with gargles or sprays of mercuric chlorid or of hydrogen dioxid. In all but a few cases the use of these remedies was abandoned at once on the administration of the antitoxin. The routine practice in the antitoxin-cases was to gargle or spray the throat every third hour during the waking hours with a solution of Seiler's antiseptic tablets or with a weak solution of boric acid. This was done merely as a precaution, for the sake of cleanliness and the mechanical effect. In some of the cases seen with Drs. Aldrich, Dickson and Flower, even this was omitted. We noticed no special difference in the time of the disappearance of the false membrane and in the convalescence of these cases than from those in which the washes were used. However, this was done as an experiment, and we would not advise the abandonment of these simple measures, which do no harm and may be the means of preventing severe mixed infections.

I have not found that the bacillus diphtheriae disappears from the throat any earlier in the cases treated with the antitoxin than in those in which the remedy was not used. However, our experience is too small to draw conclusions from and is open to several sources of error. It was found impossible to have cultures made from the throats of convalescents each day, or even at short stated intervals. It was the rule, however, to quarantine the patients until their throats were proved to be free from diphtheria-bacilli.

I have records of thirty-one cases in which small doses of the antitoxin were given to individuals constantly exposed to diphtheria. Of these twenty-one were children, and of these ten had diphtheria. Five of them showed false membranes in their throats the next day after the injections. Of the rest, in two cases the false membranes appeared on the third day, in one on the fourth day, in one on the eleventh day, and in one on the thirteenth day after the injection. These cases were usually mild, and all recovered, yielding readily to small doses of the antitoxin. The usual dose was from 1 to 2 c.cm., according to the body-weight. Four cases received 8 c.cm., and of these none contracted diphtheria. At least ten of the immunized individuals developed urticaria in from two to ten days after the injection. In one case in fifteen minutes after the injection of 2 c.cm. of antitoxin into the right arm there were several severe attacks of sneezing, followed in a few minutes by an attack of

¹ Since this was written I have learned that there have been seventeen more cases, with one death, leaving the mortality for the whole series about 7 per cent.

asthma. Two hours later there was an intense outbreak of general erythema and urticaria, which lasted several hours.

RECENT IMPROVED METHODS IN INFANT-FEEDING, WITH ESPECIAL REFERENCE TO MODIFIED MILK.

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(Concluded from page 574.)

THE quantity of breast-milk can be determined by the condition of the breasts at nursing-time, *i. e.*, whether firm or flabby, and whether the child nurses a long time, say from thirty to forty minutes, before it is satisfied. Weighing the child several times on delicate scales, before and after nursing, gives a more accurate idea of the amount of milk received. The quality of the breast-milk may be excellent, and yet the nursing may be doing badly, as the quantity is insufficient. Now let us suppose that our efforts to continue the breast-feeding prove unsatisfactory and artificial feeding is imperative, how are we to modify cow's milk to make it equivalent in composition, reaction, etc., to breast-milk?

Average healthy cow's milk contains on analysis:

Fat	4 per cent.
Sugar of milk	4 "
Proteids	4-5 or more "
Ash	0.7 "
Total solids	13-14 per cent.
Total liquids	86-87 "

Such milk is slightly *acid*. It is *not sterile*, and the temperature and specific gravity vary, of course, depending on the conditions to which it has been subjected. Comparing this with the analysis of normal average human breast-milk, we find that the amount of fat is the same. In cow's milk the sugar-of-milk is *much less* and the proteids *much more*, and it possesses the further disadvantages of being *non-sterile, acid*, and of *uncertain temperature*.

It has often been recommended to use ass' or goat's milk as a substitute for mother's milk as coming nearer it in analysis, but, as neither is exactly like this, it is just as well, and perhaps better, to use and modify the more easily obtained cow's milk. "One cow's milk," which is so often recommended and used for infants, is ill-advised, for if that cow is sick or unwell from any cause the whole of her milk, a portion of which the child is to receive, is affected; whereas, if one of a herd is similarly affected, it will alter but little the total output of such a dairy in the relative proportion of its ingredients. Jersey and Alderney milk is too rich in fat for nursery purposes. "The milk of Durham, Ayrshire, Holstein-Friesien, American grades, and common native cattle, is the best for copying human milk."¹ It is

with this milk, then, that we shall deal in considering the modified milk.

As I have said, it is the proteid or albuminoid in average cow's milk which is the ingredient that causes colic, vomiting, etc., in infants, when in excess, and it is this that we wish to reduce in copying breast-milk. In other words, cow's milk is too strong in proteids (4 to 5 per cent. or more, instead of only 2 per cent.). The sugar-of-milk should be nearly doubled (from 4 per cent. to 7 per cent.), and the fat is to be kept as nearly the same as possible.

Obviously, then, it is easy to see, with these facts before us, what we shall have to do to modify cow's milk so as to make it approach as nearly as possible mother's milk in composition.

First of all, dilute to reduce the proteids or albuminoids one-half. Then add additional cream and sugar-of-milk to bring these up to their proper proportions. Neutralize with lime-water, and heat by means of a "pasteurizer" to 167° F., which will *not* decompose the sugar and the lime-water, *nor coagulate* the proteids, but will render the milk practically sterile, and we have a modified cow's milk approaching nearly in composition, etc., average human breast-milk. I use the word "heat" advisedly, instead of that much-abused word "sterilize," in regard to artificial feeding. Mr. Gordon, of the Walker-Gordon Laboratory, is my informant in stating that in the milk of one cow in twenty-four hours there is as much citric acid as one finds in an ordinary lemon, and that it too is destroyed by an indiscriminate elevation of the temperature to 212° F., or more for an indefinite time, as is done so commonly now with the Arnold sterilizer in general nursery use. By this high heating, then, the anti-scorbutic property possessed by the milk is lost. Mr. Gordon also stated that at that temperature (212°) *all the albuminoids are coagulated* and rendered more indigestible.

Rotch had cultures made of the unsterilized whole milk in six hours after milking, and it yielded 68,000 colonies per cubic centimeter of milk, but no cultures grew from either the whole or modified milk after heating to 167° F. Cultures of the lime-water showed that it too was sterile. Leeds found no coagulation of the albuminoids at 167° F., but *above that point coagulation occurs*.

Boston and New York are at the present time the only cities that possess the thoroughly scientific and practical Walker-Gordon Laboratories or Dairies, where physicians may and do send their prescriptions for a milk of any desired analysis to be duplicated, just as one would have a recipe compounded at a druggist's. It is in part the purpose of this paper to make those physicians who are not already familiar with these laboratories and their methods to unite with those of us that are in creating a demand for this easily obtained "modified milk," so that

¹ Rotch: Boston Medical and Surgical Journal, vol. 129, p. 505.

we may persuade the Walker-Gordon Company to start a laboratory here. One has but to see the little crates of bottled "modified milk" daily left at the houses, ready for almost immediate use, to appreciate not only the convenience to the mothers, but the relief experienced by the physicians as expressed by them of "knowing that the milk is as it should be." Until we have such a laboratory a few formulæ for modifying milk in the household may not be amiss.

In passing, it is to be noted that the cream of ordinary dairies varies in fat from 15 to 30 per cent., but in the laboratories a constant cream of 16 per cent. fat is obtained by a Stockholm separator.

It should also be carefully remembered that cane-sugar is *not* to be used to sweeten the milk, as it ferments and causes colic, but that sugar-of-milk alone is to be employed.

Now, how are we to add the ingredients of cow's milk so that they will be in the proportion of fat 4 per cent., sugar-of-milk 7 per cent., and proteids 2 per cent. of mother's milk? Perhaps the most convenient, though not absolutely accurate, very simple method is the following: Determine the number of feedings the child is to have in the twenty-four hours and the amount to be given at each feeding; from this calculate the total amount of milk to be used throughout the day. Let this be made up as follows:

$\frac{1}{2}$	of the total 24 hours' supply to be cream.	
$\frac{1}{8}$	" " " " skimmed milk.	
$\frac{1}{16}$	" " " " lime-water.	

Boiled or distilled water is to be added to make up the total. Rotch has found experimentally that $3\frac{3}{8}$ drams of powdered sugar-of-milk are the requisite amount to be added for each eight ounces of the modified milk to make it equal the sweetness of human breast-milk. He also found that adding lime-water in an amount of from $\frac{1}{80}$ th to $\frac{1}{16}$ th of the whole bulk was sufficient to neutralize average cow's milk or render it slightly alkaline. Take a case, for example: A child six weeks old, with feedings every two-and-a-half hours, or eight feedings in the twenty-four hours, of two ounces each, which makes a total of sixteen ounces for the day, then we have:

$\frac{1}{2}$	of 16 to be cream	. . .	$f\frac{3}{8}$ iv.
$\frac{1}{8}$	" " skimmed milk	. . .	$f\frac{3}{8}$ ij.
$\frac{1}{16}$	" " lime-water	. . .	$f\frac{3}{8}$ j.
	Remainder, boiled water	. . .	$f\frac{3}{8}$ ix.

A measure that holds exactly $3\frac{3}{8}$ drams of powdered sugar of milk is sold by the Walker-Gordon Laboratory in Boston, and for the case in point we should add two of these measurefuls to increase the sweetness sufficiently. Divide then our modified milk between eight bottles, and our day's supply is ready to be heated to 167° F., *i. e.* "pasteurized."

The "pasteurizer" consists of a block-tin kettle

and top not unlike the now familiar Arnold sterilizer, but without the additional cover and the pan beneath for the boiling-water. Within this kettle a rack rests for holding the requisite number of tubular nursing-bottles (this shape has been found advantageous for uniform heating), and into each of which is put the required quantity of the "modified milk" for a single feeding. These bottles are plugged with cotton, as is done in ordinary sterilization. The kettle is filled with water to the height of the milk in the bottles, unlike what takes place in the Arnold apparatus, in which steam alone reaches the bottles. The tin lid is then put on the kettle, and through an aperture in it is put a Fahrenheit thermometer. The whole is then placed on a stove or over a lamp and heated to 171° F., when it is removed from further heating, but wrapped in a thick blanket (or especially-made cover) for half an hour, when "pasteurization" will be complete, as a temperature of nearly 167° F. will have been maintained for that time.

Just before feeding the following directions are to be given: Place a bottle of the milk in the specially provided nursery cylinder in tepid water, and gently heat it until the temperature of the milk is from 98° to 100° F. Use the thermometer to test the temperature of the milk, keeping the cotton stopple in the bottle until the milk is nearly warmed. After "pasteurizing" the bottles of milk should be kept in a cool place. After use rinse the bottle immediately in cold water, and before refilling boil it in a 1 per cent solution of sodium bicarbonate. It should be added that only boiled, distilled, or sterilized water is to be added to the milk.

If an infant is delicate or of feeble digestion, less skimmed milk is to be used, and also the cream may be reduced a little as the judgment prompts one. In the case of sick children increase the lime-water. If diarrhoea exists, boil the milk if necessary.

Perhaps a few words may not be amiss now in regard to the Walker-Gordon Laboratories and Dairy Farms. Several physicians are especially interested in the one in Boston, and at their head is Dr. Rotch, to whose untiring efforts we are chiefly indebted for this scientific method of infant-feeding.

"The farm and herd are under the absolute control of the laboratory, and are used for laboratory-purposes only; the cows, their food, their stables, their pasture and their drinking-water are subjected to the frequent, paid, critical examination of the best veterinary surgeon that can be procured in Boston."¹ The dairymen dress in white suits before milking, having each previously had a bath. "The cows are milked into glass pails, and the milk, after being aerated and cooled to about 44° F. in a tank of ice and water, is delivered at the laboratory in

¹ The Value of Milk Laboratories, etc. Rotch. Archives of Pediatrics, vol. x.

Boston within four hours of the milking." The average and almost stable analysis of this original milk shows a percentage of:

Fat	3.90
Sugar-of-milk	4.30
Proteids	4.00
Mineral matter	0.65
Total solids	12.85
Total liquids	87.15
	100.00

At the laboratory a ventilating engine keeps up a constant change of air, and a hose keeps the enameled-brick walls and stone floors wet, to prevent any remaining dust from contaminating the milk while it is being "modified."

The whole milk, after being "pasteurized," passes through a Stockholm separator, which makes 6800 revolutions a minute, and yielding a cream of an almost constant 16 per cent fat. It not only does this, but it removes all dirt that from unavoidable causes has gained access to the milk, thus yielding a clean, skimmed milk practically free from fat (only 0.13 per cent. remaining).

The modifier has as a result stable component parts of the original milk to work with, made up by analysis as follows:

	Fat.	Sugar.	Proteids.
Cream giving	16.00	4.00	3.60
Skimmed milk giving	0.13	4.40	4.00

A 20 per cent. solution of sugar-of-milk, freshly prepared every day with distilled water, is used to raise the percentages of sugar. The mineral salts are ignored or allowed to take care of themselves.

When a formula is received at the laboratory from a physician the prescription is copied by a clerk in a book for that purpose, and which is always open to the prescribing physician's inspection. The milk-modifying clerk picks up a basket with as many compartments as meals are ordered, and fills each compartment with a tubular bottle holding the number of ounces ordered for each feeding. After mixing the ingredients *en masse* as ordered, each bottle is filled and the basket passed to the stoppler, who plugs each tube with cotton. The whole is then "pasteurized" for half an hour after being carefully labelled. The basket of milk is then ready for delivery. The delivery-wagon is divided into two compartments; the back, which is lined with zinc and easily cleaned, is for the fresh milk and baskets and the front for soiled tubes, baskets, etc., which are sterilized at the laboratory before being taken into the "modifying-room."

Some of the more usual formulæ received at the laboratory may be useful and of interest.

For a premature baby of the very weakest digestion:

Fat,	1.00, cream 16 per ct.	f 3vj.
Sugar,	5.00, 20 per ct. sugar-of-milk solution	f 3ijss.
Proteids,	0.50, skimmed milk	f 3vj.
Lime-water,	$\frac{1}{16}$	f 3j.
Distilled water		f 3vij.

Twelve feedings of 1 ounce each.

For the same child when a little stronger:

Fat,	2.00, cream 16 per cent.	f 3ijss.
Sugar,	6.00, milk-sugar solution 20 per cent.	f 3v.
Proteids,	1.00, skimmed milk	f 3ijss.
Lime-water,	$\frac{1}{16}$	f 3j.
Distilled water		f 3ix.

Ten feedings of 2 ounces each.

For a fairly strong child, from 2 to 5 months old:

Fat,	4.00, cream 16 per cent.	f 3vij.
Sugar,	7.00, milk-sugar solution 20 per cent.	f 3ix.
Proteids,	1.00, skimmed milk	f 3j.
Lime-water,	$\frac{1}{16}$	f 3j.
Distilled water		f 3xij.

Eight feedings of 4 ounces each.

For a strong child, from 5 to 8 months old:

Fat,	4.00, cream 16 per cent.	f 3xij.
Sugar,	7.00, milk-sugar solution 20 per cent.	f 3xijss.
Proteids,	2.00, skimmed milk	f 3ix.
Lime-water,	$\frac{1}{16}$	f 3ijss.
Distilled water		f 3xij.

Eight feedings of from 6 to 7 ounces each.

For a child 6 years old with duodenal jaundice:

Fat,	0.50, cream 16 per cent.	f 3iss.
Sugar,	6.00, milk-sugar solution 20 per cent.	f 3vij.
Proteids,	4.00, skimmed milk	f 3xxxijss.
Lime-water,	$\frac{1}{16}$	f 3v.
Distilled water		f 3j.

Twelve feedings of 4 ounces each.¹

This last case was reported by Dr. Rotch as one of rapid recovery with no medicine.

If all milk is bad, or none is to be obtained (as was the case in the recent blizzard) for some days, we shall be obliged to fall back on condensed milk. Of the various brands, perhaps the Anglo-Swiss is the best. This gives on analysis:

Fat	0.75
Cane-sugar	6.00 to 7.00
Proteids	1.00

To every teaspoonful of this condensed milk add ten teaspoonfuls of boiling water. This is not good for sick children, on account of the cane-sugar it contains. To increase the percentage of fat use cream or oil in some form, such as cod-liver oil.

Barley-water, rice-water, and oatmeal-water are of no service in the supposed "breaking up of the coagulum of casein" in infants' stomachs, and may in fact be detrimental, and their use is a practice that should be discarded for the more modern, exact, and scientific methods.

In conclusion I shall give a brief table that has been useful as to the amount and frequency of feeding for the different ages:

¹ Feed every two hours.

Age.	Hours interval.	Number of feedings in 24 hours.	Ounces in each feeding.	Total ounces for 24 hours.
1st week	2	10	1	10
1st to 6th week	2½	8	1½-2	12-16
6th to 12th week	3	6	3-4	18-24
6th month	3	6	6	36
12th month	3	5	8	40

In baby-feeding begin at 6 A.M. and extend to 10 P.M. During the first month give two feedings through the night. After the first month and to the sixth month give only one. After the sixth month discontinue the midnight meal. *Boiled or sterilized water should be given between the feedings.*

Before closing I wish to express my thanks to Dr. John Dane, of Boston, for his kindness in making me familiar with the methods there used for modifying milk.

I trust these methods may meet with the approval of the profession here, as they have in Boston and New York, and that we may soon have a Walker-Gordon laboratory, which is the only one conducted on the scientific principles I have mentioned. Such a laboratory would be a help to the busy physician as well as to the mother, and a blessing to the offspring of the rich, the ignorant, and the poor.

2000 MARYLAND AVENUE.

TREATMENT OF MALIGNANT TUMORS WITH THE TOXINS OF THE Erysipelas Streptococcus and the Bacillus prodigiosus.¹

By JOHN B. ROBERTS, A.M., M.D.,
OF PHILADELPHIA.

THE proper treatment for all malignant tumors is early and radical removal. A medical man, who directly or indirectly encourages a patient with an operable malignant growth to postpone operative extirpation is guilty of the gravest professional error. If he is not sure of the character of the suspicious growth, it is his duty to insist upon examination by some one experienced in the diagnosis of such lesions. If the patient declines to allow investigation by a more experienced physician, it is his duty to decline to continue in charge of the case. Many women and men are dying in this State to-day from incurable malignant tumors, because in the early stage of the disease they placed their trust in unworthy medical attendants who were too ignorant, too careless, or too complaisant to say: "Have this tumor removed at once." Tumors in regions frequently the seat of malignant disease should always be regarded with suspicion. Delay in having the diagnosis established by competent authority should not be tolerated. The diagnosis of a malignant or probably malignant growth should be followed by prompt and thoroughly radical

excision. Very rarely powerful caustics may with propriety be substituted for the knife. Cauterization is, however, very seldom judicious; and the patient is liable to suffer more during treatment by caustics than after excision with the knife.

The procrastination of patients and the improper advice of ignorant doctors frequently result in precious time being lost. The malignant growth then becomes so extensive that extirpation is impracticable. It may happen also that virulence of the disease or delay in its removal results in its return at the seat of operation. Further operation may then be impracticable without sacrifice of the patient's life. Under these circumstances it is proper to resort to hypodermic injections of a mixture of the toxins of the erysipelas streptococcus and the bacillus prodigiosus. It is not justifiable to adopt this line of treatment in place of early and radical excision. *The cure of malignant disease is the knife, used early and used thoroughly.* In inoperable cases the toxins may be tried, though not much benefit has been proved to result from their administration. As a last resort the patient should, however, be given the benefit of the doubt, because a few cases of benefit and apparent cure have been reported.

We are indebted to Coley, of New York, for proposing this method of treatment. He was led to undertake the investigation by observing the benefit accruing from an accidental attack of erysipelas in a patient suffering with recurrent sarcoma. Those interested in the details of his study will find much to attract attention in his successive articles.¹ He first employed fluid cultures of the living germs of erysipelas for the purpose of producing an attack of erysipelas; but he soon abandoned this method because of the risk to the patient, the difficulty of producing erysipelas, and the belief that the benefit derived was due to the toxic products of the germs. The germs were therefore killed by heat and filtered out of the cultures before the hypodermic injections were made. The patient therefore received the chemic products or toxins of the germs without running the risk due to the presence of the living micro-organisms.

Laboratory observation has shown that the bacillus prodigiosus has the power of increasing the virulence of the streptococcus erysipelas. It therefore occurred to Coley that a combination of the toxins of the two germs might be more advantageous. He tried this as a next step, and now believes that hypodermic injections of the combination have cured a number of cases of malignant disease, which were too extensive to be removed by operation.

¹ Read before the Medical Society of the State of Pennsylvania, May 21, 1895.

¹ American Journal of the Med. Sciences, May, 1893, and July, 1894; New York Medical Record, January 19, 1895.

His present method of preparation is as follows:

"To make the toxins of erysipelas and the bacillus prodigiosus ordinary peptonized bouillon is put into small flasks containing from 50 to 100 cubic centimeters, which after proper sterilization are inoculated with the streptococci of erysipelas and allowed to grow for three weeks at a temperature of from 30° to 35° C. The flasks are then inoculated with bacillus prodigiosus, and the cultures allowed to grow for another ten or twelve days at room-temperature. At the end of that time, after being well shaken up, the cultures are poured into sterilized, glass-stoppered, one-half ounce bottles, and heated to a temperature of from 50° to 60° C. for an hour, sufficiently to render them perfectly sterile. After cooling a little powdered thymol is added as a preservative, and the toxins are ready for use. The toxins when prepared in this way are very much stronger than when filtered through a Pasteur, a Chamberland, or a Kitasato filter. . . . If, as is sometimes the case, the preparation is found to be too strong for use with safety, it can be diluted with glycerol or sterilized water.

"The method of preparing the bouillon in which the bacteria are grown is identical with that in ordinary use, except that it is always made from meat and is not necessarily neutralized, the acid reaction normal to the meat-bouillon being better for the growth of the erysipelas coccus.

"In order to keep up the virulence of the cultures they are put through rabbits in the following way: The hair of the ear is clipped close with a pair of scissors, and the skin washed with weak carbolic acid and then with sterilized water. A minute quantity of bouillon-culture, forty-eight hours old, is then injected subcutaneously in four or five different places in the ear. Forty-eight hours later, after again washing the ear with carbolic acid and sterilized water, a flat needle, sterilized in the flame, is inserted under the skin at or near the point of inoculation, and the layer of the skin cut off with a sharp sterilized scalpel. The piece of skin is then rubbed well over the surface of an agar-tube with a thick platinum wire needle. After twenty-four hours in the incubator the colonies of streptococci will show as minute white specks, and from them a pure culture can be obtained. If the agar is made with 75 per cent. of bouillon and 25 per cent. of urine, the streptococci will grow more freely than if bouillon alone is used.

"The dose varies from one to eight minims, and causes a distinct febrile reaction."

The treatment then, it will be understood, consists in using as a remedy for sarcoma and carcinoma hypodermic injections of the chemic substances produced by the germ of erysipelas when growing in bouillon in company with the bacillus prodigiosus. The erysipelas streptococcus and the bacillus prodigiosus are killed by heat after they have grown together, but their dead bodies are not filtered out as they were in Coley's former method. The germs, being dead, cannot cause erysipelas in the patient. They are simply used as manufacturers of the complex chemic substances that are employed as the remedy. These chemic substances and the dead germs remain in the bouillon which was used as a culture-medium.

The dose of this remedy, which is bouillon containing the dead germs and their products, is from two to eight minims given hypodermically every day or every other day. The injections are prefer-

ably made into the tumor or into the surrounding tissues; but they may be made in other parts of the body, if for any reason the former situation is undesirable. The effect of the medication is to cause the patient to have shortly after administration a temperature of from 102° to 104°. This is a symptom that the surgeon desires to obtain, for it shows that a constitutional effect has been produced. It is best to begin with a dose of one or two minims, and increase gradually as the patient becomes more accustomed to the remedy. If the depression due to the toxins is very great, they should be given not every day, but every two, three, or four days. Patients become tolerant or immune to the effect of the toxins. One of my patients was given a violent diarrhea for an hour or more, a moderate chill, and a temperature of 103° by an initial dose of one minim. Two days later very little effect was produced by another dose of one minim. Subsequently I had to increase the dose to fifteen minims before obtaining any considerable rise of temperature.

The effects of the toxins upon malignant tumors, when satisfactory, is said to be a cessation of growth, followed by absorption, or disintegration and discharge. Some reported cases of cure have been brought about in one way, some in the other.

Coley does not seem to be carried away with enthusiasm when he reports his results, but speaks in the manner of a scientific observer seeking truth. In his paper published January 19, 1895, he refers to a total of thirty-eight cases of inoperable sarcoma treated with living cultures of erysipelas or mixed toxins. He says that nine of these cases "promise to be permanently successful." He uses the words "promise to be permanently successful" because, although the tumors disappeared, the time after their disappearance was at the date of the report not in any case over six months. One of the nine patients was treated with the living cultures of erysipelas; the remaining eight were treated by the mixed toxins.¹ In carcinoma he had had no cure out of nineteen cases, but thought that the injections had an undoubted retarding influence upon the growth of the tumors.

Coley suggested that it would be well to use the toxin treatment in cases in which recurrence is likely to take place after operative removal. If the remedy has an inhibitory power, it is certainly rational to employ it before the malignant disease gives macroscopic evidence of its return.

My personal experience has been limited to three cases, all of them treated within the past six months. There has been no benefit, though in one case I at first thought the rapidity of growth was being checked.

¹ See also New York Medical Record, April 27, 1895.

The first case was a man of forty-five years, with a large ulcerated epithelioma of the lower lip and chin of two years' duration. I used mixed toxins from which the germs had been filtered. The first injection of mxx caused the temperature to rise to 104°. The next day the same dose caused the temperature to rise to 105.2°, and the man had a chill lasting twenty minutes. In the course of twelve days he received eight injections, each of twenty minims. No benefit was manifested in the local condition; but the man became very weak. He died about three-and-a-half weeks after the treatment was discontinued. It seemed to me that the end was probably hastened by the depression due to the use of the toxins. He was in good general condition when the treatment was begun.

Dr. Coley calls attention to the depressing effect of the treatment and uses stimulants to counteract it. He advises the treatment to be discontinued if no benefit is evident within two or three weeks.

The second case I saw in consultation with Dr. M. V. Ball, who had amputated the man's foot for spindle-cell sarcoma of the right heel. There was, when I saw him, a mass of sarcomatous glands in the groin extending under Poupart's ligament into the pelvis. I obtained the same preparation as Dr. Coley now recommends; that is, the toxins without the germs having been removed by filtration. Dr. Ball, who had charge of the patient, began with three-drop doses and produced chill and a temperature of 104°. The dose was later increased to six drops. The tumor became soft and assumed an inflammatory appearance, and an active lymphangitis and phlebitis extending down to the knee occurred after the injections. The man seemed to lose strength rapidly, so that the interval between doses was increased. The treatment was persisted in for some weeks, but no benefit resulted. Continuous fever became a feature of the case, and the local inflammatory symptoms did not disappear.

The third patient was a boy of nineteen years of age, from whom I removed a spindle-cell osteo-sarcoma arising from the inner surface of the left ilium. A month later it became evident that the growth, which, because of its location could not be radically extirpated, was involving the ramus of the ischium and pubes as well as the ilium. Seven weeks after the operation the mixed toxins, as used by Coley, were employed hypodermically. The initial dose was one minim. The result was a chill, a temperature of 103°, a pulse counting 132 per minute, and a violent diarrhea. Two days later another injection of one minim was given. It produced very slight symptoms.

In the course of four weeks the boy had received eight injections. After the first dose the reaction was almost negative under increasing amounts until fifteen minims were given, which caused the temperature to rise to 104°. This was the seventh injection. The eighth injection of fifteen minims given six days later caused a temperature of only 100.2°. The immunity apparently produced by one minim seems strange. The patient was given no other treatment except occasional anodynes at night until a few days before the injections were stopped; then iron, quinin, strychnin, and whisky were ordered.

At first I thought that the rapidity of the growth was diminished and the tumor becoming softer; but this was probably an error. Later it continued to grow, and the patient left the city for his home in the country.

It is interesting to know that Coley has found osteo-sarcoma less amenable to the toxin-treatment than other forms of sarcoma.

At the recent meeting of the American Medical Association in Baltimore, Dr. Senn reported to the

Surgical Section a number of cases of malignant disease treated by him with the toxins of erysipelas without success. Dr. Keen has also reported a similar want of benefit in cases under his care. On the other hand, Tilly, Moore, Kreider, Rumbold, Johnson, and others have reported favorable results. The evidence is, therefore, to a certain extent conflicting. It seems pretty certain, however, that there are cases in which the toxin-treatment has retarded the malignant process and even cured the patient. These few successes compel us to test the method in all inoperable cases, for it holds out the only hope.

THE TREATMENT OF FISTULÆ IN ANO BY LANGE'S METHOD OF IMMEDIATE SUTURE OF THE TRACT.¹

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THE reason for presenting this paper is an experience that justifies me in expressing an opinion of Lange's method of treating *fistula in ano* that is contrary to the unfavorable opinion of it held by the general surgeon, and, in fact, by some rectal specialists. I take it that the condemnation of this operation is due to a misconception of its scope or range of applicability, rather than to a failure to accomplish the desired results in suitable cases. Fistulous tracts running high into the bowel should not be treated by this plan, but in the majority of instances the sinuses are confined to the lower inch or so of the bowel. In such cases the technique to be described will often materially aid the healing process.

An inflexible rule to follow in all cases of *fistula in ano* cannot be given, as each case requires individual study and treatment.

Briefly stated, the method of treating the disease in question, as suggested by Dr. Frederick Lange, of New York City, consists in the excision of the entire fistulous tract, and the apposition of the wound by buried sutures of catgut, in order to secure healing by first intention. Strict antiseptic precautions are of course observed. In my own practice, for the past two years, I have pursued this treatment, with a few modifications, in nearly all the cases coming under observation that required operative interference. In no instance was there occasion to regret its employment. In those cases in which primary union was not secured the immediate suturing of the fistulous tract prevented hemorrhage and lessened pain, the pain being occasioned sometimes by the packing of the sinus when sutures are

¹ Read before the Medical Society of the State of Pennsylvania, May, 1895.

not employed. Frequently a portion of the wound healed by first intention, and shortened that much the period of convalescence.

The special points in the operative technique that I follow are as follows: The sphincter muscles are thoroughly stretched. Instead of attempting to excise the entire fistulous tract or tracts, the wall of the incised fistula is thoroughly curetted, and the edges of the sinus are removed if at all indolent. Bleeding, if profuse, is temporarily controlled by torsion of the vessel, or by the application of hot-water compresses. Silkworm-gut sutures are inserted in a similar manner to that employed in repairing a lacerated perineum, the sutures being passed at intervals of half an inch and about a quarter of an inch from the edge of the wound. It is a buried suture, that is to say, no portion is exposed within the sinus. After all the sutures are inserted they are tied with a single surgeon's knot.¹ The ends of the gut should not be cut short, as they are liable to stick into the flesh. The tension exerted by the suture must not be excessive, only sufficient to bring the raw surfaces into accurate apposition. When more force than this is employed the wound is puckered, and healing is either prevented or seriously retarded. Superficial sutures are used wherever the skin or mucous membrane is not closely united, especial attention being paid to this, in order to prevent the entrance of fecal or foreign matter, which, should it occur, would prove disastrous to primary union. When the operation is completed a suppository of ten grains of iodoform, or five grains of aristol, is inserted into the bowel, and some of the dry powder is sprinkled over the external parts. A liberal supply of gauze and cotton and a T-bandage complete the dressing. No opium is given, if it is possible to avoid its use. The bowels are moved on the third day by the administration of small doses of calomel and sodium bicarbonate, followed by a saline. Immediately preceding the fecal movement an enema of six or eight ounces of olive-oil is given. This lubricates the parts and softens the stool. Patients are kept in the recumbent position from ten days to two weeks, the length of time being proportionate to the extent and depth of the lesion. Tuberculous subjects improve most rapidly when not confined to bed longer than absolute prudence demands.

During the healing process two points require the surgeon's attention, *the burrowing or formation of fresh sinuses and the onset of pain.*

The development of burrowing, or the formation

of fresh sinuses, is generally indicated by the sudden appearance of an increased amount of purulent discharge, or by an induration of the tissues about the site of the former fistula. Upon discovering the seat of trouble the requisite number of sutures should be removed, and any adhesions that interfere with the wound healing from the bottom should be broken down with a probe so as to allow free drainage, and the tracts should be kept perfectly clean by frequent syringing with hydrogen dioxid, or some other antiseptic and pus-destroying solution. If a new sinus has formed, it should be opened at once.

Regarding the appearance of pain, Allingham¹ states: "Always encourage your patient to tell you directly he has any pain in or near the healing fistula; never make light of his complaints; often he will be the first to discover, by the existence of some unpleasant sensation, the commencement of a small abscess or sinus, and will be able also to indicate its situation."

Unless otherwise indicated, the sutures are removed within ten days or two weeks; frequently a few are taken out within a week. It is best, however, to err on the side of leaving them in too long.

In conclusion, I would state that, having given this operation a fair trial, I am inclined to consider it of decided advantage in the treatment of many cases of *fistula in ano*. Even if primary union is not obtained, the patient will be in the same position as if no attempt had been made to secure it; whereas, if healing ensues, the gain is a very considerable one.

1610 ARCH STREET.

CLINICAL MEMORANDUM.

GONORRHEAL SALPINGITIS, OPERATION, RECOVERY; RUPTURED TUBO-OVARIAN ABSCESS, OPERATION, DEATH.

BY LOUIS FRANK, M.D.,

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GYNECOLOGIST TO LOUISVILLE CITY HOSPITAL; OBSTETRICIAN TO KENTUCKY SCHOOL OF MEDICINE HOSPITAL, ETC.

CASE I.—The history in the first case I report herewith was that the patient, a woman, had been married several years and had given birth to two children, the youngest three-and-a-half years old. At this labor, or at the previous one, she suffered a laceration of the cervix, and also a laceration of the perineum. There was no history of any puerperal trouble whatever. She began complaining of pain after the birth of the last child; she had been a perfectly healthy woman previous to that time, and the symptoms were in all probability due to extensive laceration of the soft parts. To remedy this an

¹ I am indebted to Dr. B. F. Baer, of this city, for the suggestion to use silkworm-gut in these cases, and likewise for the information that a single surgeon's knot prevents any danger of this material slipping.

¹ Diseases of the Rectum, fifth edition, London, 1888, p. 54.

operation was performed upon the perineum about sixteen months ago. She, however, found no relief, and gradually grew worse after the operation on account of imbedded sutures in the perineum. She was afterward operated upon by my friend, Dr. Wathen, who removed the sutures and sewed up the lacerated cervix. Relief followed this operation and the woman was regaining her health until about five months ago, when she had a specific vaginitis, from what source I do not know. This vaginitis was very severe, there being a great deal of discharge, and the disease extended rapidly into the cavity of the uterus, and also through the tubes, infecting the peritoneum within two or three weeks, as I think, after she began complaining. At this time she had a great deal of abdominal tenderness, slight at first, gradually increasing in intensity, and finally becoming localized over both ovarian regions; I saw the woman through the kindness of Dr. Wathen after she had been ill for two or three weeks. At the time I first saw her there was a decided enlargement about the size of my fist in the left broad ligament. Shortly afterward she became demented; whether this was an example of "true dementia" or not I am unable to say; she had, at least, hallucinations and delusions; she did not recognize any one, and it was almost impossible to keep her in bed; never to my knowledge did she have a lucid interval during a period of seven weeks. During this time the pulse was very rapid, reaching 150 or 160; the temperature, however, was never much above 100°, varying from 99° to 100° and a fraction. Emaciation followed rapidly, so that within a few weeks her previous weight of 120 or 125 pounds was reduced to not more than 75 or 80 pounds. For a long time I thought she would die, and so told her husband. However, she finally began to rally under strychnin, with stimulants, and the local application of heat and hot vaginal douches.

She continued to improve until February 23d, when she was in a condition we thought favorable for an operation. An examination at this time showed that the mass in the pelvis had almost entirely disappeared. In the right side, where the large tumor was previously felt, there was now not much induration; in fact the enlargement was greatest on the left side. The uterus was enlarged and retroflexed, being fixed firmly in the cul de sac. We expected to find considerable pus in the tubes.

At the operation we found a true parenchymatous inflammation of the tubes themselves, with extensive adhesions, localized peritonitis about the tubes, and a great many adhesions between the tubes and the peritoneum, and also between the ovaries; the fimbriated end of one tube was adherent to the uterus; both the tubes were enucleated, and there was very little pus, only a few drops, coming from each one. Dr. Cashin, of the City Hospital Resident Staff, made the bacteriologic examination, and found the streptococcus pyogenes albus in pure culture. Since the operation the woman has had no rise of temperature, and the pulse has not been above 96, and this just a few hours after the operation was completed. We expect that she will do uninterruptedly well.

An interesting point about this case is that we are able to trace the inflammation directly, and to follow it up in its passage through the uterus into the tubes. Another is the apparently small amount of damage that had been done locally, the adhesions not being very dense, and

there being no other change, except the increased thickness, with little pus—a true parenchymatous inflammation of the tubes.

As to the operation, had we been able to diagnose accurately the condition that existed, these tubes and ovaries might have been easily removed by an operation that is now becoming popular with some operators, through the vagina, the uterus being removed, if necessary, at the same time. However, we were not able to recognize this condition previous to operation, as we are unable to do in many cases.

CASE II.—The woman in the second case gave the following history: She was twenty-six years old, and stated, when coming into the hospital, that she had been taken sick with an acute pain radiating from the left hip to the umbilicus. A great deal of pain and tenderness had previously been noticed in the right iliac fossa. Later the pain became more general, more localized at first in the epigastric region, remaining localized there for a period, and then spreading over the entire abdomen. At the time of entering the hospital the temperature was 103°, the pulse-rate 120, and there was a great deal of abdominal distention; the tympanites, the interne tells me, was markedly less in the right iliac fossa, where he thought he was able to obtain a flat percussion-note. He also thought he detected a tumor in this region. The woman denied absolutely ever having had coitus, and no vaginal examination was made. She was sent to the medical ward, the diagnosis of suppurative appendicitis having been made; it was the hope that by medical treatment she could be relieved without surgical interference. She was given small doses of opium, which, together with local applications, brought the pulse down to about normal, and the temperature to 99.8°.

The following morning when the interne made his usual round he found the woman with a pulse that was imperceptible, covered with a cold, clammy perspiration, and with all the characteristic symptoms of shock. He at once diagnosed a rupture probably of the appendix, and being unable to obtain Dr. Wathen by telephone he sent for me. I advised an immediate celiotomy, stating that I did not believe it was an instance of ruptured appendix, basing my opinion upon the fact that the pain had not been sufficiently localized, and also that upon making a vaginal examination I found a very large ulcer on the floor of the ostium vaginae. I found the vagina and uterus filled with stinking pus. I made the statement that I did not think there was a ruptured appendix, but probably that the tubes had been infected with rupture of a tubal abscess, which was most likely the cause of the trouble. I recognized the fact, however, that we might have an instance of appendicitis, or of many other things, *e.g.*, extra-uterine pregnancy, rupture of the gall-bladder, or other suppurative troubles about the abdomen or pelvis. The symptoms were too obscure to determine definitely.

Under stimulants the woman rallied sufficiently to understand her condition, and was told that an immediate operation offered the only hope of relief. She accepted this, and the operation was performed in the afternoon of the same day. She went on the table with a very good pulse, and stood the operation fairly well. In making an incision we found the omentum very black and adherent in front to the abdominal wall.

Carefully separating the adhesions upon the left side first, I found that they were not very dense, being comparatively slight and very superficial. In attempting to pass my hand above I probably caused some pressure, and there was a rupture through the omentum and a gush of about a quart of very offensive nasty pus. I immediately passed my finger down in the right iliac fossa and found a large tumor high up, about the position of the caput coli. I was not able, however, to detect the appendix nor to make out anything very distinctly. The uterus was felt imbedded in adhesions and immovable, as had been demonstrated by vaginal examination before the operation. The cavity was thoroughly irrigated with many gallons of water, and gauze drainage was packed in between the intestines wherever it was possible. The woman rallied fairly well from the operation, but died at one o'clock the same night, nine hours after the operation.

The post-mortem examination showed that there was on the right side a large ovarian abscess which communicated with the tube, in which there was a rupture just at the junction of the tube with the uterus. This communication had been established, as shown by an abscess in the broad ligament, probably by a rupture at this point, primarily into the broad ligament. By gently pressing the tube near the ovary, pus would escape into the cavity, thus showing how the extensive contamination took place. The other tube and ovary were in about the same condition and were filled with pus. The uterus was also filled with pus of the same character. Cultures were made from pus from the abdominal cavity, and also from pus that came from the ovary, and from that coming from the tubes. In all the staphylococcus pyogenes aureus was found. I think this was a case of staphylococcal infection, and both cases reported were evidently of specific origin, at least venereal in their origin. I believe infection to have been produced in the latter case by the chancroidal ulcer which the woman had presented. I have seen one other case in which a chancroid was undoubtedly the cause of pyosalpinx. In the other case the chancroid was situated on the cervix.

I would like to hear some of the gentlemen discuss the low operation in such cases as the first one reported, if we were able to determine the exact condition existing.

DR. W. H. WATHEN said: The first report is interesting to me because I have followed the history of the case for probably six or eight months, having operated upon the patient then for the removal of some silk-worm-gut sutures, which were buried in the perineum and had been causing intense pain, and also for a lacerated cervix. The case, as reported by Dr. Frank, is correct, and when I referred the patient to him four months ago she was then apparently insane. I saw little more of her until a few days ago when I assisted Dr. Frank in the operation. The operation by the vaginal route for the removal of the ovaries and tubes I do not think could have been performed, because the adhesions were very extensive, and we would have had great difficulty in separating the ovaries and tubes sufficiently to have brought them down through the opening made into Douglas's pouch, then ligating, and removing them. This case, however, could have been treated by the vagina easily if we had performed a hysterectomy.

There has been a great deal written during the last year emphasizing the advantages of the vaginal method over the abdominal method in the removal of pus-tubes, usually performing a hysterectomy at the same time; some distinguished operators claim that this is by far the better and safer operation. I have read the reports carefully, and there is almost a universal conclusion by French surgeons in favor of the vaginal method. It is easy to understand that the vaginal method is better if there are no large accumulations of pus, and if there are no intestinal adhesions, provided the uterus is removed at the same time; but no one can possibly diagnose intestinal adhesions, or their extent, until the abdomen is opened, and we come in contact with the adhesions. I have had several illustrations of that, and I have recently operated upon patients when I do not believe it would have been possible to remove the ovaries and tubes, and to separate the intestinal adhesions, even if I had taken out the uterus, because they were so extensive; and if an attempt had been made to separate the adhesions the intestines would probably have been badly injured and the patient would have lost her life. For the reason that we are unable to diagnose intestinal adhesions, I do not believe the vaginal method can take the place of the abdominal method in all cases. And the vaginal method of operating when the uterus is not removed, and even if the uterus is removed, is sometimes, I am sure, a very imperfect method, because there are extensive adhesions that cannot be separated. If, in an effort at separation of the adhesions, the omentum is torn and an opening left in it, we may not detect it, and it is left to cause after-trouble. The vaginal method, if we remove everything, including the uterus, and separate all adhesions, is certainly the better method, if we recognize, as is now claimed by many operators, that when one removes pus-tubes on both sides, taking out the ovaries and tubes, the uterus ought also to be removed.

Another interesting point is that in an examination of the pus no gonococci were found. That might be urged against the specific origin of the trouble, but bacteriologists who have made frequent examinations of pus from tubes that have been shown to be of specific origin have often failed to find gonococci; and the longer a case has existed the less certain are we to find these bacteria. They were present at first, and probably could have been found in the tubes during the early inflammation, but were finally destroyed.

I know very little of the history of the last case except as it has been reported to-night, and when the woman was admitted to the hospital the disease had progressed too far for any relief to follow operative measures; but I am a little surprised that such a case should have been put in the medical ward, for there is nothing in the history, and nothing in the post-mortem examination, to show why it should have been a medical case. This case brings out the point that general physicians often complain that the surgeon wants to get hold of cases of appendicitis, etc., when they belong legitimately to the general physician. In this instance if the specialist had been called a few weeks before the patient died he could at once have detected the trouble, and probably an operation would have relieved her.

I was recently called to see a woman who had been treated for six weeks by one of the best physicians in

this city, one who is often called in consultation. In a digital examination, without the least difficulty, extensive pelvic trouble was diagnosed. An operation was performed, and now the woman is relieved of her trouble. I think there ought to be no conflict between the general physician and the surgeon, but if there were a constant interchange of ideas and courtesies many lives might be saved.

LABORATORY STUDY.

A CONTRIBUTION TO THE STUDY OF STRYCHNIN-TETANUS.

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AND

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ONE of the first results reached by the application of the experimental method to the study of drugs was the knowledge that the tetanus produced by strychnin is due to a direct action on the spinal cord. This, as is well known, was shown by Magendie's classic experiments and afterward confirmed, among others, by Stannius. The latter further showed¹ that the convulsions depend on the occurrence of stimuli from without—that is, that the convulsions are the results of exaggerated reflex excitability. Freusberg² has gone into the subject at more length and comes to the same conclusion, that strychnin-tetanus differs from ordinary reflex only quantitatively and not in quality, and this view is now, we believe, almost universally held.

To explain the increased reflex excitability, several hypotheses may be formed. It is conceivable that either the whole of the structures, both cells and fibers of the spinal cord, are excited to increased function or that the action is confined to the "sensory" cells of the arc, the "motor" cells, or the connections between these two. At first consideration one is inclined to believe that the motor cells and probably the whole cord are stimulated, for the characteristic difference between strychnin-reflex and ordinary reflex is not so much a shortening of the period between stimulus and response (Freusberg) as the increased strength of the movements and the participation in them of a very much larger number of muscles than in the normal response. Stannius, however, showed that after division of the cord and section of the posterior roots of the lower half no tetanus took place in the lower limbs, as might have been expected if the motor cells had been stimulated. This experiment has been extended by Hering,³ who found that after section of the whole of the posterior roots of the cord strychnin produced no movement. Hering adduces this as a proof that even in a state of the greatest stimulation the cord possesses no automatism.

Poulssohn,⁴ approaching the subject from another point of view, finds that besides the excito-reflex action, strychnin possesses a paralyzing action on the cord, and that both these conditions are present at one and the same time. This he showed by cutting off the external stimuli

by dipping the frog in a cocain-solution, when he found the animal to lie as if paralyzed by one of the hypnotics. He does not attempt to explain the paradox, his experiments being designed to show that this paralyzing action on the cord is present. Poulssohn's results have been disputed, but have been confirmed many times in Schmiedeberg's laboratory, in which this forms one of the "lecture-experiments." A parallel condition in which one of the functions of the cord remains active, while another is already paralyzed, has been shown to be produced by other drugs, as for example, by sanguinarin (Meyer¹ and Borneol Stockman).²

Some time after our investigations were commenced we found a little-known paper by Spence, which we consider to contain important facts bearing on the theory of the action of strychnin. Spence's investigations³ were undertaken with the object of confirming in the frog Magendie's results in mammals. For this purpose he destroyed the circulation and applied an extract of nuxvomica to the exposed spinal cord, and found that convulsions were produced as if strychnin had been carried to the cord by the blood. Incidentally he remarked that on placing the extract on the upper part of the cord increased reflexes could be got from the arms, while the lower part of the body remained unaffected. Later, tetanus of both arms and legs resulted from irritation of the skin of the arm, while irritation of the legs caused only ordinary reflex. Eventually irritation of the arms caused no spasm of the legs, but irritation of the legs caused spasm of the whole body.

One of us⁴ had already commenced work with the same method of direct application, and our results coincided, as will be shown, with those of Spence. Our method was to expose only a part of the spinal cord to the action of the poison. The first experiments were unsuccessful, owing to our attempting to preserve the circulation in at least a portion of the cord. This was abandoned, and the experiments were carried out on frogs in which the circulation had been destroyed by excision of the heart and destruction of the lymph-hearts. The cord was cut in the region of the medulla from four to six hours before the observations took place. The animal was placed in the frog-holder used in the Leipzig physiologic laboratory, and the cord exposed at the desired point by cutting away the posterior arches of the vertebrae with a small rachiotome, and carefully removing the membranes. In the first experiments only the upper part of the cord was exposed from the medulla oblongata to the lower border of the large nerves given off to the anterior extremities. A one-tenth per cent. solution of strychnin sulphate was applied to the cord with a small pipet, the head being lowered to prevent as much as possible the diffusion of the solution along the cord. In a few moments a distinct increase in the reflex excitability was observed on touching the arms, and soon the lightest touch of the arms elicited a complete tetanus of the legs and whole body. This tetanus

¹ Arch. f. exp. Path. und Pharm., xxix, 397.

² Journ. of Physiology, ix.

³ Edinburgh Med. Journ., 1876.

⁴ Dr. Muirhead had, unfortunately, to leave the University through ill-health before this research was completed. With his consent I have taken up the subject, and feel that a point has now been reached at which the publication of our results is desirable.—E. M. H.

¹ Müller's Archiv, 1836.

² Archiv f. exp. Path. und Pharm., iii.

³ Pflüger's Archiv, 54.

⁴ Archiv f. exp. Path. und Pharm., Bd. xxvi.

presented no appreciable difference from that observed in intact frogs under a similar dose of strychnin. On the other hand, if the legs were touched or even sharply pinched, no response was observed, except sometimes the weak reflex movement of the legs observed in unpoisoned frogs with the circulation destroyed, the arms not moving at all. This tetanus could be elicited any number of times by touching the arms, while irritation of the legs remained without effect.

Eventually one of two things occurred; either a tetanus could be brought on by pinching the legs as well as the arms, the strychnin-solution having accidentally diffused along the cord, or else one could get no response from either the legs or arms, the cord being apparently paralyzed either from the action of strychnin or from the absence of circulation. In some cases, after general tetanus was well marked from touching the arms, the cord was severed below the exit of the arm-nerves. In two of these a normal reflex could still be obtained by touching the legs, while touching the arms caused tetanus of the upper part of the body.

In the next series of experiments the lumbar portion of the cord was exposed in a similar manner, the head elevated and the drug applied as before to the exposed cord about the origin of the great nerves to the legs. The result was similar to that observed when the cervical portion of the cord was subjected to the action of the poison. A few moments after strychnin was applied, if the legs were touched a complete tetanus of the whole body resulted, while if the arms were touched only a slight reflex, or none at all, occurred.

Our experiments, therefore, confirm in general those of Spence. We did not, however, observe his third stage in which, after application of the drug to the upper part of the cord, the irritation of the legs caused general tetanus, while irritation of the arms caused no movement.

Our results seem to us to admit of only one interpretation, that for the production of strychnin-tetanus in a group of muscles it is not necessary that the motor nerve-cells for that group should be exposed to the action of the poison. Thus, in the experiments in which strychnin was applied to the upper part of the cord, tetanus occurred in the leg from irritation of the arms. Here the reflex arc passed from the skin of the arm through the sensory fibers of the posterior root to the cord, then down the cord and through the motor cells of the anterior horn in the lumbar region to the sciatic nerve and ended in the muscles. On irritation of the legs a normal reflex was sometimes elicited, but often no response was obtained. Here the arc was from the skin of the legs through the posterior roots to the anterior motor roots, and thence again through the sciatic nerve to the muscles. The motor cells in the anterior horn are thus common to each of these arcs, and if the motor cells were the site of the strychnin-action the same exaggerated reflex would be got from each.

The second series of experiments in which strychnin was applied to the lower part of the cord shows further that the fibers of the cord leading from the brain to the motor cells are not the site of the strychnin-action. In the first series one might have supposed that those fibers passing through the poisoned area might be affected and cause the exaggeration of the reflex in the hind legs. This explanation would be, however, very far-fetched,

as there is every reason to suppose that the descending motor fibers are isolated from impressions from the time they leave the brain until they reach their corresponding motor cells. The second series dispels any doubt as to this, as it is impossible to suppose that the motor fibers for the arms can pass through the lower part of the cord, yet irritation of the leg causes movement of the arms when the "arm-area" is unaffected by strychnin, as shown by the normal reflex or total absence of movement on irritation of the arm.

From these experiments we draw the conclusion, then, that strychnin does not act on the cells of the anterior horn, nor on the fibers descending in the cord from the brain to those motor cells.

We next attempted to find whether the cells of the posterior-root ganglion were the site of the action of strychnin. For this purpose the circulation of the brain was destroyed in large frogs, the posterior-root ganglion exposed in the lumbar region, where it is situated at a considerable distance from the cord, and a strychnin-solution applied to it. No tetanic movements or increased reflex could be got on irritation of the skin of the corresponding leg nor on stimulation by the electric current of the corresponding nerve-root.

The converse of this experiment was also carried out by destroying the brain and medulla by crushing, and exposing the cauda equina and last posterior-root ganglion on the right side. The ganglion was destroyed and the nerve between the ganglion and the cord put upon electrodes and subjected to a weak electric stimulation, which caused moderate reflex contraction of the muscles of the posterior extremities. Now there was injected $\frac{1}{2}$ mgrm. of strychnin sulphate in solution into the abdominal lymph-sac. In a few moments the reflexes became increased, as shown by the strength of stimuli required, and shortly afterward we could get complete tetanus of the whole body on stimulating the nerve or by touching any portion of the frog. Some time later the paralytic stage came on, and the response to stimuli became weaker and weaker, until finally we could get no response. Hering found also that stimulation of the posterior nerve-roots central to the ganglion caused strychnin-convulsions, while Stannius could not elicit tetanus by this means.

On comparing in a strychninized frog the result of stimulation of the posterior root proximal to the ganglion on one side with that of stimulation of the sciatic nerve on the other side, the results were the same except that for the sciatic a slightly stronger stimulus was necessary than for the posterior root.

From these observations we think the inference is clear that strychnin-tetanus is not due to an action on the cells of the posterior-root ganglion. Thus the part of the cord in which the alteration due to the strychnin occurs must be the connection between the posterior root and the cells of the anterior horn. Through the work of Golgi, Cajal, and others, it has been recently demonstrated that these are not directly connected. The modern theory of the spinal cord is that the sensory nerve-root entering the cord divides into two main fibers, one running upward and one downward. From each of these fibers small branches are given off which terminate in brushes around the motor cells and around certain intercalated cells. A reflex impulse, therefore, passing up from the exterior may be diffused through

several motor cells by means of these end-brushes. In strychnin-tetanus some resistance to the passage of the impulse in its course between the posterior horn and the end-brushes is removed. That this resistance does not lie in the end-brushes may be shown by the same arguments as were used to show that the motor cells were not affected by the strychnin, for in our first experiments the lumbar motor cells and the brushes around them were certainly outside the poisoned area. To explain the action of strychnin, then, one must have recourse either to an action on some more or less hypothetic cells intercalated in the reflex arc, or else to a lessened resistance to the passage of impulses along the fibers lying within the cord between the posterior horn and the cells of the anterior horn.

In the ganglia of the sympathetic chain there occurs also a connection between cells and end-brushes. Langley and Dickenson¹ have shown that all the sympathetic fibers passing to the pupil through the superior cervical ganglion have such an interruption. It, therefore, seemed of interest to examine whether strychnin has any effect on these ganglia. Several experiments were made on narcotized cats with this object, the cervical sympathetic being exposed and cut, and the strength of stimulus required to cause dilatation of the pupil estimated before and after strychnin. No alteration could be made out either in the strength of stimulus required or in the rapidity or completeness of the dilatation. The sympathetic ganglia differ, however, so widely from the spinal cord that their end-brushes may well differ in their reaction to poisons, and we lay no great weight on such negative result. At the same time, if any inference whatever is to be drawn from these experiments it is in favor of our theory that strychnin does not act either on the end-brushes or on the motor cells.

For further examination of the action of strychnin (and with the solution of the strychnin-action a great advance will be made in our knowledge of the action of morphin and the other opium-alkaloids), it seems to us that the reaction of the simpler invertebrates must be studied. Our experiments have satisfied us that its stimulant action is located in the parts connecting the fibers entering the posterior horn with the end-brushes around the motor cells, and that neither the latter nor the cells of the posterior-root ganglion are necessarily affected by it, and the inference may be drawn that the resistance to the passage of reflex impulses in the normal animal lies, therefore, in this part of the arc.

The pleasant task remains of thanking Professor A. R. Cushny, at whose suggestion and under whose direction the foregoing work was carried out.

NEW DEVICE.

A WATER-BATH FOR PARAFFIN IMBEDDING.

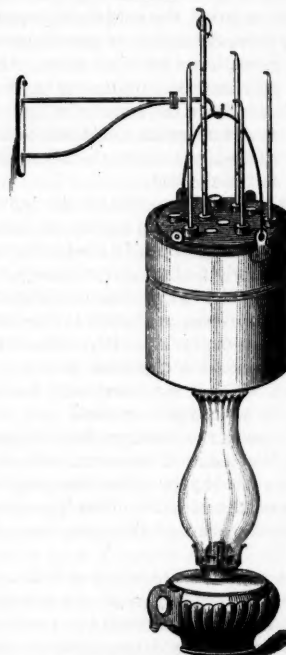
BY D. H. GALLOWAY, PH.G., M.D.,
OF CHICAGO, ILL.

A WATER-BATH that is cheap, efficient, and easily managed, is something that will be greatly appreciated by all physicians with limited laboratory facilities and a desire to do pathologic work. An expensive water-bath

with mercurial thermoregulator is not very satisfactory. Such a bath costs \$25 or \$30; gas is necessary, and it requires an expert to keep it in running order. I wished to examine some pathologic tissue while in Mexico, where such conveniences are difficult to get, and devised a very satisfactory bath. It consisted of an ordinary two-quart tin lard-pail, with two holes punched in the lid, and hung by a string at a convenient distance above the table.

It was filled half full of water and a lamp placed underneath. A clinical thermometer was introduced through

FIG. 1.



Water-bath, complete.

one of the holes, and the temperature regulated by the height of the lamp-flame. I then took a two-dram homeopathic vial (a straight tube would be better) and cork to fit, bored a hole through the cork, and through this hole passed a glass tube, one-eighth of an inch in diameter and twelve inches long. I bent the other end of the tube to a right-angle and drew it out to a fine point, in which I left a very small hole. This allowed the vapor of water, oil, or alcohol to escape, and prevented the entrance of dust or moisture. When the temperature of the water reached 48° or 50° C. and became stationary, I put the paraffin and tissue into the bottle, closed it tightly with the cork and tube, and introduced it into the water through the second hole in the lid.

In using this contrivance care must be taken not to disturb the lamp after the tissue is put in. The thermometer may be raised occasionally to see that the temperature is right. The only difficulty is in regulating the lamp, which must be done every time it is filled or the flame extinguished. After a little experience with a particular lamp the operator learns just about how high to turn the blaze, after which but little time is required

¹ Roy. Soc. Proc., vol. xlvii, 1888, p. 423. Langley, Journ. of Phys., ii, 1890, p. 146.

to regulate the temperature each time the lamp is lighted. I have easily kept the temperature constant—within 2 or 3 degrees—for twenty-four or forty-eight hours, and with almost no attention after starting.

This simple apparatus is sensitive to any considerable changes of temperature of the room. To obviate this and to provide for carrying a number of specimens through simultaneously, I contrived a modification that may be made in the following manner:

Procure two tin pails of different sizes—those holding three quarts or four quarts are convenient—and place the small one (after removing the bail) in the larger. A few small pieces of glass-tubing serve to keep the bottoms one-eighth of an inch apart. Between the sides of the two pails place upright a piece of glass-tubing

MEDICAL PROGRESS.

Sigmoido-proctostomy.—At a recent meeting of the Johns Hopkins Medical Society, KELLY (*Bulletin of the Johns Hopkins Hospital*, 1895, vol. vi, No. 47, p. 30) reported the case of a woman, twenty-two years old, with a history of pelvic inflammatory disease accompanied with severe suffering, in which in the course of operation 6 cm. of strictured rectum were removed. The lumen of the upper sigmoid portion was so wide and the rectal portion was so rigidly contracted that the injury could not be repaired by anastomosis. The operation was, therefore, concluded by suturing both of the divided ends of the bowel into the lower end of the abdominal inci-

FIG. 2.



Bottle, with fittings, for paraffin and specimen-tissue.

long enough to reach from the bottom to an inch above the top. Then pack this space tightly with cotton batting to within one-and-a-half inches of the bottom and half an inch of the top. In the space at the top of cotton pour liquid plaster-of-Paris and allow it to harden. Through the glass tube introduce into the space below the cotton three or four ounces of glycerol. With a pair of tinner's shears cut a circle out of the cover of the inner pail, leaving a margin of one-eighth of an inch inside of the rim. Fit into the remains of the cover a circular piece of wood three-eighths of an inch thick, and fasten by driving a few small nails through the tin margin left for that purpose. In the middle of this wooden cover nail the ring, which will serve as a handle as it did on the tin lid. Through the wood bore from twelve to twenty holes three-quarters of an inch (or of a size to admit the bottles to be used) in diameter. Select corks to fit these holes, and bore the corks to fit the glass tubes attached to the bottles, so that when the specimen is in the bath the hole in the lid will be closed. Solid corks will close the holes not in use. A small hole near the center will admit the thermometer and allow sufficient room for escape of surplus steam. Now get a "bird-cage bracket" and fasten it to the wall at a convenient distance above the table; on this hang the apparatus, place a lamp underneath, and it is ready for use. Aside from the thermometer and lamp, it has cost about fifty cents and two hours' time. One or two cents' worth of oil will run it twenty-four hours. From twelve to twenty operations can be carried on at a time, or that number of students may use it at once, the regulation of the heat being left to one. The instrument I have made for my own use has a capacity of sixteen bottles. It is of the size described. A smaller one would not be so serviceable owing to the difficulty of keeping the small volume of water at a constant temperature, but it may be enlarged without limit and made to accommodate any number of students in a laboratory. If it is desired to use gas instead of oil, a Bunsen burner with the pipe removed may be used. An ordinary Bunsen burner will not do, as the flame, if turned low, will snap back and soon set fire to the rubber tube.

26 THIRTY-NINTH ST.

sion, the sigmoid at the extreme lower angle, and the rectum just about it.

On examination two months later, an opening about 3 cm. was found above the symphysis pubis, at the bottom of which were two orifices, a larger one below, about 2 cm. in diameter, through which the index finger passed readily up over the left iliac fossa in the direction of the descending colon. Immediately above this, separated by a narrow bridge of tissue, was a small orifice, about 1 cm. in diameter, into which the index finger was passed with difficulty. A long, tight stricture of the rectum, from the abdominal wall down to a point behind the cervix uteri, was found. The woman's suffering was increased after this examination, it is thought, from rupture of the coats of the bowel through into the peritoneum on the right side. A week later the entire scar containing the sigmoid and rectal orifices was dissected out, and these were separated and wrapped separately in gauze and laid aside. To reach the pelvic organs it was necessary to detach numerous loops of adherent coils of small intestine bound together by fresh exudate and bleeding freely. An opening was found in the strictured rectum below the promontory of the sacrum on the right, about 2 cm. from the cut end and communicating with the peritoneal cavity. The uterus and ovary and tube were so covered with dense fibrinous adhesions that it was impossible at first to tell where they lay or decide from appearances which tube and ovary had been removed in the first operation. The uterus was finally discovered by cutting through the adhesions in the posterior part of the pelvis and evacuating an encysted peritoneal accumulation of 120 c. cm., when the left tube was found and the position of the uterus traced by it. The enucleation was then continued by following the contour of the uterus and stripping up the adhesions, digging it out of a bed of densely organized lymph. The ovarian vessels were then ligated, the uterus amputated in its cervical portion just above the vaginal junction, after ligating both uterine arteries, and the stump of the cervix closed by antero-posterior silk sutures. The cleaned-out pelvis presented the appearance of a rough excavation without peritoneum. The condition of the patient now became so alarming that the operation had to be brought to a

speedy termination. Three cm. of the upper part of the strictured rectum were removed, severing it below the rupture. The wedge-shaped flaps were approximated with silk sutures, closing its lumen. The end of the sigmoid was then caught with six long silk traction-sutures through the peritoneal and muscular coats, entering about $\frac{1}{2}$ cm. from the edge of the incision and emerging on the incision without piercing the mucosa. The walls of the bowel were from 3 to 4 mm. thick and somewhat rigid, without the flaccidity of the normal sigmoid. An oblique incision about 3 cm. long and directed from before backward and from left to right was now made into the rectum on the pelvic floor just above and behind the vagina, close to the cervix, below the lower end of the stricture. With a pair of long artery-forceps passed through the anus and ampulla and out through the incision into the pelvic cavity, the six traction-sutures were caught in a bunch and pulled down and out of the anus, drawing the sigmoid into the rectal incision, which was held open with forceps to facilitate the entrance. The bowel was kept from slipping back into the pelvis by grasping the traction-sutures in the heel of the bite of the forceps lying across the anus in the gluteal furrow. The pelvis was washed out and a gauze pack inserted around the sigmoid, and another up among the inflamed bowel and brought out at the lower angle of the incision, which was closed at this point. The woman made an excellent recovery, and subsequently had normal bowel-function. The purulent discharge constantly decreased after the removal of the pack from the lower end of the wound, and at no time was fecal matter passed in any other way than by the anus.

Typhoid Fever.—At a recent meeting of the Manchester Medical Society, DRESCHFELD (*British Medical Journal*, No. 1790, p. 869), after speaking of the difficulty of distinguishing, especially in the feces, the typhoid-bacillus from the bacterium coli commune, pointed out that occasionally the sputum (in some cases of pneumo-typhoid) and the urine might contain the typhoid-bacillus, and these secretions should, therefore, be disinfected. In the feces the bacillus is rarely found before the eighth or ninth day of fever, and it appears that already a few (from six to ten) days after the cessation of the fever the bacilli are no longer present in the feces. Dr. Dreschfeld related some instances of infection from the ingestion of oysters, and pointed out that typhoid fever might be communicated by other articles of food. The typhoid-bacillus grows very readily on most vegetables, and these by being washed or watered with contaminated water might convey the germs of the fever. Insects by coming in contact with contaminated sewage or typhoid-dejecta might carry the organism and deposit it on fruit. A certain family predisposition to typhoid is to be recognized, and an instance was related of a group in which seven members of one family were affected with typhoid within a few weeks. Statistics show that though the mortality from typhoid has decreased very much in England in proportion to the population, the case death-rate, or the relation of the mortality to the morbidity, still shows a mortality of 17 per cent. This compares unfavorably with the mortality observed in some of the German and in the American hospitals in which the treatment by the cold bath was carried out systematically. The good effect of the antiseptic treatment, which

is now largely adopted in England, and which has many advocates, is not apparent from the statistics.

Wound-diphtheria in Association with Diphtheria bacilli in the Healthy Pharynx.—SCHOTTMÜLLER (*Deutsche medizinische Wochenschrift*, 1895, No. 17, p. 272) has reported the case of a child, a year and two months old, who presented an excoriation in the right inguinal flexure, which in the course of a few days increased rapidly in size and was the source of a good deal of pain. Inoculation of blood-serum from some of the material upon the surface of the excoriation was followed by the development of cultures of the diphtheria-bacillus, together with staphylococci. On inquiry it was learned that some two weeks previously an older child had died of pharyngeal diphtheria, the patient himself, however, escaping. A pustule formed in the right groin of the latter, which, after picking, gave rise to the formation of a considerable ulcer. The pharynx of the child presented a normal appearance, but diphtheria-bacilli developed in blood-serum inoculated with secretion from the throat. Both these and the organisms obtained from the groin proved virulent to guinea-pigs. Under treatment with applications of mercuric chlorid and iodoform, the wound healed readily and the child speedily progressed to perfect recovery.

Removal of an Ovarian Cyst from an Aged Woman.—At a recent meeting of the New York Obstetrical Society, DR. AUGUSTIN H. GOELET presented a large ovarian cyst which he had removed from a patient sixty-nine years old. The case was reported to show that advanced age does not contraindicate celiotomy in these cases, and also to illustrate the importance of careful preparation of the patient in order to overcome intestinal distention and facilitate the execution of the operation. When the patient first came under observation there was great distention, so that she was for three weeks placed upon a restricted diet. At the time of the operation there was absolutely no intestinal distention. In consequence the operation was completed in fifteen minutes, and the patient made a rapid recovery without a single unfavorable symptom.

Diseased Conditions of the Myocardium of the Auricles.—As the outcome of a careful pathologic study RADA-SEWSKY (*Zeitschrift für klinische Medizin*, Band xxvii, Heft 5 and 6, p. 381) arrives at the conclusion that, independently of the disseminated, circumscribed, cicatricial form of myocarditis, there occurs also a diffuse fibrous degeneration of the muscular wall of the heart, which is often more pronounced in the auricles than in the ventricles. He further believes that the irregularity of the action of the heart frequently observed in conjunction with chronic myocarditis is due rather to the involvement of the auricular than of the ventricular wall.

Castration for Prostatic Hypertrophy.—At a recent meeting of the Genito-Urinary Section of the New York Academy of Medicine, HAYDEN (*Journal of Cutaneous and Genito-Urinary Diseases*, May, 1895, p. 224) reported the case of a man, seventy-one years old, in which serious symptoms of five years' standing, due to prostatic hypertrophy, were relieved by double castration.

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THE SIGNIFICANCE OF THE DEATH-RATE IN OUR LARGE CITIES.

SCARCELY a philosopher or economist has delivered himself in print of late who has not felt called upon to bewail and denounce the growing tendency of our population to mass itself in large cities. Thirty years ago, we are informed, hardly 10 per cent. of our people resided in cities of 50,000 inhabitants or upward, while now nearly 20 per cent. are to be found there. This is all wrong, we are told. The country is depopulated and its deluded children are packed together in sweltering masses in street, court, and alley, a sort of Black Hole of Calcutta, to become the prey of the vice, disease, and poverty that are declared to be the chief characteristics of city life. Our great cities are denounced as cancers upon the body politic, or simply as hot-beds of disease, of licentiousness, of political corruption, of atheism, and of anarchy.

The principal proof of this usually cited is the high death-rate, which of course supports the whole charge, for is it not written, "The wages of sin are death?" And this, as all vital statistics assure us, is from 20 per cent. to 70 per cent. higher than in the country. Statistics, however, are dangerous allies in this case, for they prove too much. If we

follow them back a few decades, we shall be surprised to find that according to their record the "wickedness" of cities is rapidly diminishing, nay, even some of our worst "Sodom" of to-day have actually a lower death-rate than that of the rural districts in the "good old days" of heathful innocence.

In reality the question is simply one of intelligence. Whenever in city or country the individual or the community have the sense to secure for themselves pure air, pure water, and sound foods, there health, comfort, and morality will prevail; and whenever these conditions are neglected the opposite results will as surely occur. The city is but the country concentrated—the evil and the good of a thousand square miles heaped together upon a few acres. The massing together of the evil readily strikes our attention, but that of the good seems likely to escape it, and yet it occurs in almost the same proportion if we will only see it. The mere fact of the steady rush of the best elements of our rural population toward the great cities ought at least to raise such an inference. The bulk of the people are not fools. The commercial, literary, and social advantages of the city are obvious, but what as to health and morality?

Take the high death-rate, for instance. At first sight this is appalling, but on closer examination we find it following exactly the same lines as in the open country, scourging, decimating the stupid, the intemperate, the vicious; sparing the intelligent, the temperate, the virtuous. Before going further, however, it must be said that the apparent excess of the city death-rate has been unquestionably exaggerated by the much more thorough system of reporting and recording deaths carried out there. In most country districts this is much more lax, in some cases absurdly so, especially in the case of children, of whom frequently neither the birth nor death is recorded; and it is in infant mortality that a very large proportion of the city excess is found. In many rural neighborhoods the cemeteries are small, denominational, often private affairs, and no burial-permit whatever is required.

On a careful examination of the tables, the first thing that strikes us is that the mortality of a city depends not upon its size or age, but upon the intelligence and decency of its inhabitants and authorities. For instance, London, the largest city in the world, stands at the very head of the list for healthfulness, with the truly extraordinary death-rate for 1894 of 17.9 per 1000 (*Report of Medical Officer*

at the Privy Council, May, 1894). This has been steadily reduced from nearly 80 per 1000, in 1600, with a population of 300,000, and when 20 per 1000 was reached some twenty years ago (population, 3,500,000) it was thought the minimum had been attained, and yet 5,000,000 shows a further decrease. Where it will stop no one knows, and MR. CHADWICK is enthusiastic enough to declare that he can build a city to order so as to have any death-rate from 3 per 1000 up.

Next in order come our own cities, Philadelphia, with a death-rate of 22.6; New York, 28.6; then Paris, with 32; Berlin, with 35; Vienna, with 43; and last of all Constantinople, with 65. The causes for these startling differences cannot be considered in detail here (though for anyone who has visited the cities in question no argument is necessary, except that supplied by his own olfactory nerves), but there is one significant fact which is a good index to all the rest. If we were to arrange these cities in the order of the average number of persons inhabiting each house within their limits, we should find them in almost identically the same order as above, ranging from London, with 6.5, to Vienna, with 42. In London no house or building is permitted to exceed in height the breadth of the street upon which it faces, and the number of inhabitants to each house is strictly limited by law; in the other cities, especially in New York and Vienna, the greed of the landlord is permitted to pile story upon story, or the filthy laziness of the tenant to dig basement under basement, practically unchecked by law. The rapacity of the rich, the apathy of the poor, and the cowardly stupidity of the government bring their own reward.

The same principles that govern the respective death-rates of different cities will be found to control the distribution of the mortality in the different wards of each individual city and among the different age-divisions of her population. This is strikingly illustrated by the admirable "mortality-maps" of Boston and Philadelphia, constructed by Billings, and just published as a special report of the Eleventh United States Census.¹ In these the city is shown divided into wards and sanitary districts, each of which division is shaded in red so as to correspond to the height of its death-rate according to a scale of color indicated in the margin. The most striking thing about them is the wide

range of variation of the death-rate, which in some districts is nearly three times as great as in others. Nor is this due to mere density of population, because in Boston, for instance, the most densely populated ward (Ward 16, with 184.16 persons to the acre) has a death-rate of only 26.6, which is also reached by Ward 20, with a density of only 42.2 per acre.

Similarly, Ward 13, with a density of only 45.2, enjoys the bad eminence of the highest death-rate but one, 32.9, that of the city as a whole being 23.59. More impressive yet is the case of the two sanitary districts into which Ward 10 is divided, of which District A, with a density of only 55.6, has a death-rate of 24, while B, with a density almost double, 102.2, has a death-rate of barely 12.6, the lowest in the city. Neither would it seem to be a question of geographical situation or elevation, for Ward 9 is divided into two districts of nearly equal size, the northern of which has a death-rate of 31.1, and the southern of only 15.9. The northwestern third of Ward 10 (District B) has a rate of 12.6, while the remainder of the ward reaches 24.9. These side-by-side contrasts are the more remarkable when we remember that the rate of Districts B in both the last-mentioned wards is actually *below* that of healthy rural districts, which range from 14 to 18 per thousand.

What then is the secret of these striking differences? This is a hard question to answer, but when we turn to the record of births and nationalities of the inhabitants we find some highly suggestive figures. In Ward 8, which is guilty of the highest death-rate in the city, we find of its 13,000 inhabitants only 2900 (22.3 per cent.) are children of native-born parents. In Ward 13, which comes next in "bad eminence," only 1776 out of 23,300, or 7.7 per cent., are of native-born parents, while in Wards 12 and 6, which follow next in fatality, 22 per cent. and 7 per cent., respectively, are of that descent. Does the same relation hold in the contrasted districts of the Ninth and Tenth Wards? Here are the figures: In Ward 9, District A, death-rate 31.1 per cent., has a native-born parents' population of 22.6 per cent. District B, 46.5 per cent.; death-rate 15.9 per cent. In Ward 10, District A, death-rate 24.2 per cent.; population of native-born parents 33.4 per cent. District B, 65.2 per cent.; death-rate 12.6 per cent. In these two last cases it would appear that to double the per cent. of all those having native-born parents is to cut the death-rate in two. District B, of Ward 10, which has the lowest death-rate, has also the

¹ Vital Statistics of Boston and Philadelphia for the Six Years ending May 31, 1890.

highest proportion of "American" inhabitants in the city. In short, the death-rate of a ward like that of a city is solely a question of the cleanliness, intelligence, and morality of its citizens. Those who live like pigs must expect to die like hogs.

Nor is this by any means a question of wealth or poverty. The ward with the lowest death-rate in Philadelphia (Thirty-third) is described as mainly occupied by "small two and three-story dwellings; the residents employed in workshops and railroads;" while the third lowest (Twenty-eighth) has for its residents largely clerks and mechanics, and has "considerable manufacturing interests." Strange as it may seem, investigations have shown that rents and the cost of living generally are actually higher in the slums and purlieus than in "Peabody" and other "model" buildings, or in respectable artisan districts and suburbs. The only thing that compels any man to stay in the slums is inability or unwillingness to behave himself decently in respectable quarters. If, on the other hand, the dirt, warmth, and sociability of the congested precincts suit his taste, by all means let him stay there—but he must pay the penalty.

The other distribution of the death-rate which this report impresses upon us is that as to the age of its victims. No less than 26.1 per cent. of the total deaths in Boston, and 23 per cent. in Philadelphia, occur in children under one year of age. In fact, it is in this age-class that the greater part of the increase of the city death-rate now lies. King Herod would have reason to be proud of his performance compared with such a record. The very age at which the welfare of the individual can be most absolutely controlled and secured by parents or other guardians, when the organism literally requires only two things to thrive—pure air and pure milk—is the period in which the greatest slaughter takes place. Broadly regarded, the excess is punishment for neglect, a check upon the propagation of the unfit, and in a most merciful form.

Korosi, in Buda-Pesth, and Straussmann, in Berlin, have reported results that seem to indicate that even the floor of the building occupied has a distinct influence on the death-rate, those living in the basements having the highest rate, those in the fourth and fifth stories the next, and those in the second and third stories the lowest.

To sum up, the excessive death-rate in our large cities is due almost wholly to causes under our control. It is a question simply of the intelligence and

alertness of the individual and of the municipality. It is one of the great selective forces of nature for promoting cleanliness, morality, and common-sense, and eliminating dirtiness, vice, and stupidity. Just as there are no fouler slums (though there may be larger) in London than can be found in almost any country town, and no worse criminals or a larger proportion of them than in some most sparsely settled districts, so the average city death-rate need not necessarily be higher than the rural. In some districts it is and will be actually lower, and in some, into which have drifted and inevitably drift the failures of every description—the vicious, the improvident, the lazy, the low-lived—it is much higher, and one might perhaps add that it ought to be.

THE RELATION OF DISEASES OF THE SPINAL CORD TO VASCULAR LESIONS.

A priori evidence would lead to the belief that disease not dependent upon direct exciting influences, such as traumatism, chemic action, heat, cold, or upon extension from adjacent morbid processes, must be due, particularly when deep-seated and beyond the reach of extraneous conditions, to factors operating through the intermediation of the circulation. Such disease may be brought about by the presence in the blood of minute vegetable or animal organisms or their products or of other toxic matters, acting either directly on the tissues themselves or upon the bloodvessels. In either event there result certain functional, nutritional, structural, or organic changes that we recognize as disease.

In an interesting monograph recently published,¹ the position is well taken that a very large proportion of cases of cerebral disease and a not inconsiderable proportion of cases of spinal disease are due to vascular lesions. This difference in vulnerability is to be attributed to differences in blood-pressure, the spinal cord receiving its blood-supply through narrow, long, and tortuous arteries, which are thus not subject to high pressure. The vascular supply of the cord may be considered as derived from two systems, a central and a peripheral, between which, however, there is no sharp division. It has been shown that a transverse section of the cord can be divided into three vascular zones: (1) the inner part of the gray matter (except the pos-

¹ On the Relation of Diseases of the Spinal Cord to the Distribution and Lesions of the Spinal Bloodvessels. By R. T. Williamson, M.D. (Lond.), M.R.C.P. London: H. K. Lewis, 1895.

terior horn and its head), which is supplied by the anterior median artery; (2) the superficial layer of white matter, which is supplied by the peripheral arteries; and (3) the peripheral part of the gray matter and the adjacent white matter, which are supplied by both the peripheral and central arteries. For further convenience the blood-supply of the cord may be divided into an anterior and a posterior. The gray matter is more abundantly supplied with the blood than the white. The arteries penetrating the spinal cord are believed to be true terminal arteries. The lowest part of the cord receives but a scanty blood-supply. The spinal veins anastomose freely. A larger portion of the blood passes into the peripheral veins, especially the posterior, than into the anterior; so that while the anterior arteries are more important than the posterior, the posterior veins are more important than the anterior. The cord contains no true lymphatics. These are represented by closed spaces around the bloodvessels and by lymphatic clefts in the adventitia.

Now, in accordance with the blood-supply affected by any one of a considerable number of influences, we may have developed one or another of the various forms of spinal disease inflammation, softening, hemorrhage, sclerosis, the localization and distribution of the disease depending upon the circulatory area involved, and no doubt in part upon the nature of the causative influence. As already stated, these influences may act directly on the tissues of the cord or indirectly through changes brought about in the walls of the bloodvessels. The propositions herein presented are not based upon mere hypothetical data, but their applicability depends upon a considerable and accumulating pathologic evidence of unequivocal character, and of which a considerable and varied array is presented in the monograph to which we have already referred, and from which the essential points of this article have been derived.

EDITORIAL COMMENTS.

The Lymphocytotic Action of Pilocarpin.—It will be recalled that a short time ago quite a ferment was created by the announcement through the public prints that a New York physician had discovered in pilocarpin a remedy for tuberculosis. That this announcement was unwarranted, as well as unjust, the sequence of events amply demonstrates. The fact of the matter is that Dr. Louis Waldstein, of New York, and working in Berlin, found in a number of infectious diseases certain changes

in the blood that seemed to him indicative of a tendency to, if not a part of the process of, recovery, and similar changes he found could be induced by the subcutaneous administration of pilocarpin in small and medicinal doses. The report of these observations, and the conclusions to which they lead, are detailed in the *Berliner klinische Wochenschrift*, 1895, Nos. 17 and 18.

Waldstein made a study of the colorless blood-corpuscles in cases of diphtheria treated with the antitoxin, from the height of the attack until convalescence was established. He found that prior to the injection of the antitoxin, and during the acme of the disease, the multinuclear leukocytes were increased in number, while the lymphocytes were diminished. At this stage the nuclei, particularly of the uninuclear cells, stained feebly with methyl-green, and the granulations, which were small and few, were stained bright red by acid fuchsin. As soon, however, as improvement began to set in the relation suddenly changed, the number of multinuclear cells declining to the normal and the uninuclear increasing. Now both nuclei and granulations stained more deeply, and the latter increased in number and size. When the lymphocytes exceeded the normal they contained the finest granulations, and there were present also cells containing eosinophile granulations. As recovery was approached the number of coarsely granular cells gradually diminished. In cases unattended with improvement the injection of the antitoxin was followed by an increase of lymphocytes, without, however, a reduction in the multinuclear cells. This persistence in the increase of the number of multinuclear cells proved of unfavorable prognostic omen, the patients dying or the disease assuming a chronic character, with involvement of the lymphatic glands or of the ears. The mutual relation of the leukocytes bore no constant relation to the course of the fever or the character of the pulse; nor did the visible membrane appear to stand in any causal connection therewith. Post-mortem examination of children dead of diphtheria disclosed swelling of Peyer's patches and enlargement of the mesenteric glands, and not rarely acute disseminated miliary tuberculosis.

Assuming that artificial increase in the number of lymphocytes played an important part in recovery from infectious diseases, an agent was sought for capable of effecting such a change, and pilocarpin was found to answer the purpose. With this drug marked reduction in the size of enlarged lymphatic glands in the sequence of measles and scarlatina was effected. Children were given injections beneath the skin of one-thirtieth grain at intervals of one or more days for a week or ten days. Improvement also followed such treatment in a case of mediastinal and multiple lymphomata, although the patient was at the same time taking arsenic. The opinion is expressed that pilocarpin is capable of a curative action upon lymphatic glandular tumors. Examination of the blood under such conditions disclosed a state of hypo-leukocytosis, which disappeared with the institution of the treatment. The temperature was also slightly elevated, but declined under treatment. Complaint of pain referred to the ears likewise disappeared.

In a fatal case of advanced pulmonary and glandular tuberculosis the injection of one-sixtieth grain of pilocarpin was followed by vomiting, elevation of temperature, and a scarlatinous exanthem, and post-mortem examination disclosed recent disseminated areas of hepa-

tization in the lungs, with miliary nodules and a cavity with smooth walls. In another fatal case the temperature rose after daily injections of one-thirtieth grain for a week, and a week afterward meningeal symptoms appeared, followed in five days by death. Post-mortem examination disclosed carnified areas, miliary nodules, a cavity with smooth walls, and cicatrices in the lungs, with tuberculous meningitis, hydrocephalus and internal hydrorrhachis. In other cases also the injection was followed by elevation of temperature, blood-streaked expectoration, and pain in the side. It will be noticed that the symptoms and the anatomic conditions resembled those that followed injections of tuberculin. These changes are ascribed to a stimulating influence upon the lymphatic apparatus. In a case of lupus of long standing an injection of one-thirtieth grain of pilocarpin was followed by marked improvement. As no reaction occurred the dose was subsequently increased to grain one-twelfth, and the improvement was maintained.

Seven cases of streptococcus angina, in patients from three to ten years of age, were treated with daily injections of from one-sixtieth grain to one-twelfth grain, with the result of increasing the number of lymphocytes and diminishing the number of multinuclear cells, causing a decline in temperature and leading to recovery. In a case of uncomplicated diphtheria no influence was exerted by pilocarpin, but in cases of mixed infection the conjoint use of pilocarpin and the antitoxin was followed by results of which either alone was not capable.

These admirable observations, while interesting and suggestive, are far from conclusive, but they open a field of investigation that, it is to be hoped, may yield productive therapeutic results.

The Abuse of Reprints.—When a man has done excellent work and published the results in an interesting paper his friends and his colleagues not infrequently write, begging for a reprint of it, or asking where a copy of the original can be secured. We suppose that the present popular "Reprint" had its origin in these requests; but the history of the subject, interesting as it may be, is a matter which is overshadowed by the present abuse into which the innocent pamphlet has fallen.

We cannot see the least impropriety, after a man has written a good magazine article, in his mailing copies of it to such of his friends as may be interested in the subject-matter or in his progress in the scientific sphere. This may be defined as the *use of the reprint*. We have a collection of carefully selected pamphlets from friends all over the United States, which we value highly, and for many of which *we asked*, because we desire frequently to refer to and to quote from them.

While such a legitimate use of printed matter is highly commendable, we are almost disgusted to observe that certain members of the profession, whose vanity, thirst for fame, mercenary tendency, or combination with drug-manufacturers exceeds their modesty, have turned this little courtesy into an open, culpable medium of advertisement.

Almost daily there reach us from the ends of our country little pamphlets which report ordinary cases studied by extraordinary Dr. So-and-So, or which terminate with the most unstinted praise of some nostrum, or which sum up a sufficient number of cases of some par-

ticular operation to make obvious the desire of the writer to be an authority upon the subject treated.

Too often, instead of the reprints supplied ordinarily by the journal, thousands are bought and paid for, and distributed to all the doctors in the directory. Specialists are more prone to the habit than general practitioners, because of its success as an advertisement.

At times the reprints are bound in ornamented or loudly colored paper, and have printed in one corner "Presented with the compliments of the [would-be-known but at present obscure] author."

One particular pamphlet has impressed us with the complete lack of modesty and dignity which may result from carelessness in the manner in which one presents his work to the world. This pamphlet is rather elaborately covered in tinted paper, describes certain surgical operations by a learned professor, who seems to be a great man, for he signs himself A.M., M.D. (mentions a German university), M.R.C.S. Eng., Prof. of Surgery, etc. He never refers to the pamphlet in other terms than a "monograph," and hence seems to be proud of it. The "monograph" is fully illustrated with whole-page plates, the first of which shows the "Immersion of the Hands in Antiseptic Solutions, Preparatory to Operation," but really seems intended to be a portrait of the learned gentleman, with, incidentally, some of his assistants. The portrait is good, but we would observe that the antiseptics is bad. Only the tips of the fingers seem to be in the antiseptic solution; the basins are painfully small, two individuals are obliged to wash in one basin, and we observe that this precaution is taken before the operation is to begin, for the patient is not present.

It would be unjust to the doctor, who is a Professor of Surgery, not to say that much contained in the pamphlet is good, but we must infer that it is an advertisement from its closing words:

"Physicians receiving a copy of this monograph and who desire further information about these cases or my clinics generally will please call or address me at my office.

Your, sincerely,

" — — — "

We feel that all the skill and learning of this doubtless most excellent gentleman can scarcely make us pardon the vanity of his pen. We are, furthermore, sorry to single out one man's foibles, but hope that his sufferings will be a warning to other of our friends. It were better to remain obscure than to appear ridiculous.

Bacteriologic Examinations by the Bureau of Health.—It is announced that the Bureau of Health, through its Division of Pathology, Bacteriology, and Disinfection, is now prepared to make bacteriologic examinations in suspected cases of diphtheria. Culture-tubes can be obtained at the various police stations, and the inoculations made by the attending physician or upon request by an authorized medical inspector. As the specific organism often disappears from the throat during convalescence it is desirable that the culture-inoculation be made as early as possible. The advantages and the desirability of early diagnosis are perfectly obvious. It is further desirable that inoculation be made from the throats of those that come in contact with cases of diphtheria, as virulent diphtheria-bacilli have been found under these conditions.

Inoculations should be made by rubbing the cotton swab attached to the end of the wire contained in the test-tube gently but freely against any visible exudate, and then drawing it over the surface of the culture-medium without breaking the surface of the latter. The swab should then be replaced in the tube from which it was taken, and both tubes replugged and put back into the box. The box may be returned to the station from which it was obtained as soon as possible or brought directly to the laboratory. The tubes will be collected every afternoon, examined the following morning, and reports will be mailed by 1 o'clock P.M. The attending physician can obtain information, however, by telephoning directly to the laboratory after that hour.

Cases that prove to be false diphtheria will not be visited by the health inspectors except upon the request of the attending physician. On the other hand, cases that prove to be true diphtheria will be subjected to the usual rules and regulations governing contagious disease.

The Bureau further announces that it is also prepared to examine blood, urine, gastric secretion, sputum for tubercle-bacilli, and other pathologic material.

Scorbutus in Infancy.—In an interesting address recently delivered before the First District Dental Society of the State of New York, Dr. E. C. Kirk called attention to the occurrence of scorbutus in infancy as a result of lack of variety in the diet of infants artificially fed, and particularly of the restriction to the so-called "prepared foods." Not only does such a deficiency in diet give rise to the profound blood-changes that underlie scorbutus, but, from changes in the reaction of the secretions of the mouth, the teeth undergo decalcification. Children thus affected are prone to be highly nervous and irritable, markedly cachectic, and disposed to catarrhal disorders. The margin of the gums recedes from the teeth and the gums become thickened, necrotic, and vascular, bleeding upon slight provocation. The teeth may become loosened, even to the degree of falling out, and small vascular tumors may form at the site of developing teeth. Hemorrhage often occurs beneath the periosteum, most commonly of the femora and bones of the leg, and is attended with swelling and exquisite pain. The importance of recognizing the nature of the cases in which these manifestations appear must be perfectly obvious, as upon the diagnosis depends the application of the appropriate therapy, which will often be attended with results that appear scarcely short of the marvellous. We have here, too, the illustration of the importance of examining the mouth in obscure conditions, and also of the service an intelligent dentist can render the general physician.

The Decline of Keeleyism.—Information received by Rev. Dr. J. M. Buckley, the able and conscientious editor of the *Christian Advocate*, from sixty-eight clergymen and twenty-five physicians, in response to an appeal for data upon the results yielded by the so-called Keeley gold cure in the treatment of inebriety, shows that of 534 cases personally known to have been thus treated 251 relapsed, 13 became insane, 11 died, 2 committed suicide, and 275 were cured. To render the investigation perfectly impartial Dr. Buckley had the correspondence thereupon received and cared for by a dis-

interested person and the statistics prepared by another person, and finally had the result scrutinized by two other persons. Of the accuracy, reliability, and impartiality of this investigation there cannot be the slightest doubt or question. It merely shows that those most interested have lied concerning the results of the treatment, as they have also lied about the pretended composition of the materials used. And it is logical to conclude that they are as little to be trusted in other matters. It is almost too much to hope that Dr. Buckley's exposure will have a serious effect upon the outrageous and unprincipled imposition upon human credulity and gullibility; but it must hasten the natural death that comes to all similar enterprises. As long, however, as there can be found persons willing to be mystified and to be duped there will also be those willing to accommodate them.

SOCIETY PROCEEDINGS.

THE FORTY-FIFTH ANNUAL MEETING OF THE MEDICAL SOCIETY OF THE STATE OF PENNSYLVANIA.

Held at Chambersburg May 21, 22, 23, and 24, 1895.

DESPITE the chilling blasts that swept down the Cumberland valley, carrying with them clouds of mist and rain that at times completely obscured the surrounding hills and converted the macadamized roads of Chambersburg into rivulets, physicians—both delegates and permanent members—flocked in from all portions of the State to attend the forty-fifth annual meeting of the Pennsylvania State Medical Society, which convened in that historic town during last week. That the attendance was up to or above the usual the overcrowded hotels and the roll-book of the registration-office attest. Indeed, the hotel-accommodations were utterly insufficient to meet the demands made upon them, and to contribute still further to the discomfort of the incoming guests were the unprecedented efforts on the part of avaricious proprietors to double the usual ratings of their houses. Notwithstanding these unfortunate features, however, the cordiality of the citizens of the town and the untiring labors of a worthy Committee of Arrangements, under the chairmanship of the genial Dr. George S. Hull, converted what might have been, to say the least, an unsatisfactory meeting into one that will be handed down in the records of the association as abounding in interest and pleasant memories. The interest that was manifested was twofold. In the first place, the historic surroundings, redolent with the legends of the Civil War, and abounding in the natural attractions of a mountainous district, were in and of themselves more than sufficient to draw to the gathering many who seized this opportunity of visiting the famous locality, and who brought with them their wives and daughters, thus swelling the list of visitors to considerably over three-hundred; and, again, the distinguished standing of the two candidates for the presidency of the organization, Dr. John Montgomery, of Chambersburg, and Dr. William S. Foster, of Pittsburg, rendered their canvass one of more than ordinary interest to their constituencies.

A detailed account of the business transacted during

the session would be tedious and unnecessary, and only the essential features of this portion of the object of the convention need be noted. Especially worthy of mention, it would seem, was the effort made by the retiring President, Dr. John B. Roberts, of Philadelphia, as embodied in a resolution presented by him on the opening morning, to render more active and efficient the Board of Trustees, in order that that body should no longer be regarded as a mere figure-head in the organization of the Society. Dr. Roberts' resolution was referred to a special committee of five, consisting of himself as chairman, with Drs. Bishop, Craig, Daily, and T. S. K. Morton as colleagues, whose duty it will be to attend to this and other business of the association, and to make a report at the coming meeting. The treasurer, Dr. George Benson Dunmire, of Philadelphia, reported a cash balance in the treasury of \$2330.28; and the secretary, Dr. William B. Atkinson, congratulated the Society on the continued increase in the membership of the State and County societies. It was recommended that steps be taken by the Society, in the hope of still further increasing the membership, to bring its work more definitely to the notice of the large number of physicians in the State who, at present, practically know nothing of its design, or of the attractions, social and scientific, of its meetings.

Dr. H. G. McCormick, of Lycoming County, presented the report of the State Board of Medical Examiners, embodying the result of the last examination of applicants desirous of practising medicine within the limits of the State. He reported that 12.4 per cent. of those who applied had been rejected by the Board.

Dr. Howard F. Hansell, of Philadelphia, presented the report of the Committee on Contagious Ophthalmia. He stated that Senate Bill 516, for the regulation of the reports of midwives and nurses in all cases of purulent ophthalmia to the Health Officer or other designated official, had already passed the Senate, and would probably become a law during the present year.

Dr. Edward Jackson, of Philadelphia, in rendering the report of the Publication Committee, suggested that copies of the *Transactions* of the Society be sent directly, either by mail or by express, to the members of the various County Societies, instead of being sent in bulk, as at present, to the various secretaries of these organizations. This was agreed to.

There had been a growing feeling that it would be well to break the precedent of electing a President from the town or city in which the meeting is held. Accordingly, while Dr. Montgomery was heartily supported by his County society and the local physicians, the majority of the Nominating Committee was in favor of Dr. Foster, who was selected by a vote of 32 to 5. The Committee made the following report of nominations: *President*, Dr. W. S. Foster, Allegheny County; *Vice-Presidents*, Dr. John Montgomery, Chambersburg; A. P. Hull, Lycoming; T. H. Shapack, Green; A. B. Brumbaugh, Huntingdon; *Secretary*, W. B. Atkinson, Philadelphia; *Assistant Secretary*, A. L. Stevens, Bradford.

Dr. Foster has been a practising physician in Pitsburg for over twenty-six years. He has been a vice-president of the Society, a member of the Judicial Council, and for five years a member of the Legislative Committee. By appointment of the Governor he is Secretary of the State Board of Medical Examiners, and has in his prac-

tice achieved an honorable and widespread reputation. Harrisburg was selected as the place for the meeting in May next, and Dr. W. S. Bishop chairman of the Committee on Arrangements.

It is probable that the most striking feature of the present meeting was its social element. It was the universal statement that at no other place of meeting was better entertainment afforded. Said one of the visitors: "Our entertainment is more than we could ask or expect;" and a physician who had attended sessions of the American Medical Association at Washington, Baltimore, Milwaukee, and elsewhere remarked that the reception at Wilson College was better in every respect than any he had ever attended. Assembled in the new chapel of the college, a happy address of welcome was delivered by the president, the Rev. Dr. Samuel A. Martin. In addition there were songs by the college glee club and music by the college orchestra.

DR. JOHN B. ROBERTS delivered an excellent popular address on

THE PRESENT ATTITUDE OF PHYSICIANS AND MODERN MEDICINE TOWARD HOMEOPATHY,

after which the college was thrown open to the visitors. On Thursday evening there was an excursion to Mont Alto Park, including a visit of half an hour at the Industrial School at Scotland. The park was illuminated with electricity, a banquet was served in the dining-hall, and dancing followed in the pavilion. At 9 o'clock, Friday morning, the festivities culminated in a free excursion to Gettysburg, including a stop of thirty minutes at Penmar, the picturesque excursion resort of the Western Maryland Railroad.

Notwithstanding this great abundance of entertainment the scientific portion of the meeting did not fall below the average. Thanks to the energetic efforts of the chairman of the Committee on Scientific Business, Dr. Charles W. Dulles, of Philadelphia, a large number (seventy-seven) of valuable papers had been presented. Pre-eminent among them may be mentioned the addresses of Drs. Hildegard H. Langsdorf and I. C. Gable, and the papers of Drs. John H. Packard, Benjamin Lee, Edwin Rosenthal, H. A. Arnold, and Joseph McFarland. Dr. Gable's address included a *résumé* of the present status of the various medical subjects that have during the past twelve months occupied more than the ordinary amount of attention. Especially have the infectious diseases commanded a large amount of study. The discovery of the antitoxic blood-serum theory of the treatment of diphtheria is probably the most important advance of the year. Since its adoption the mortality of diphtheria in Berlin has dropped from 44 per cent. to only 21 per cent. Welsh, in the Philadelphia Municipal Hospital, has treated eighty-eight cases with only twenty-one deaths, giving a mortality of a fraction over 23 per cent. There is now a gross mortality of from 5 to 24 per cent., as rated against the older mortality of 45 per cent. A sufficient length of time has not yet elapsed to state definitely the exact value of the antitoxic treatment, but enough data have been collected to prove that this is a material advance over the old methods of treatment. It would not be proper to stop the employment of the tincture of the chlorid of iron and the other old remedies, but the antitoxin should be used in addition.

Antitubercle-serum has been yielding good results in the treatment of pulmonary tuberculosis, both in the hands of eminent observers abroad and in this country. Guaiacol, however, is probably, together with creosote, the best remedy in the symptomatic treatment of pulmonary tuberculosis.

Local antiseptics in the treatment of wounds has been greatly modified of late. Iodoform has been replaced by aristol, acetanilid, and a host of other odorless coal-tar preparations. Intestinal antiseptics has been largely developed, and an immense number of drugs, mainly coal-tar preparations, have been employed advantageously.

DR. BENJAMIN LEE's paper on the

NECESSITY FOR A STATE SYSTEM OF REGISTRATION OF VITAL STATISTICS IN PENNSYLVANIA

was received so cordially that the following resolutions were unanimously passed and transmitted to the Legislature at Harrisburg:

Resolved, That the Medical Society of the State of Pennsylvania considers the registration of births, marriages, and deaths at the Central Bureau of Vital Statistics at the capital of the State a matter of the utmost importance in the interest of medical science, of public health, and of protection to human life; and, therefore,

Resolved, That the Society respectfully memorializes the honorable the Senate and House of Representatives of the State of Pennsylvania in favor of the passage of the bills introduced at the present session to authorize the State Board of Health to employ a clerk for the registration of vital statistics, to confer the powers of a Board of Health on the School Board of each township, and so to increase the appropriation to the State Board of Health as to enable it to discharge efficiently this important duty as assigned to it by law.

Resolved, That copies of the preceding resolutions, signed by the President and Secretary, be at once transmitted to the Hon. C. Wesley Thomas, President *pro tem.* of the Senate, and the Hon. Henry F. Walton, Speaker of the House of Representatives, at Harrisburg.

DR. T. D. DUNN, of Westchester, read a paper on

SOME OF THE SEQUELÆ OF TYPHOID FEVER.

He has noticed erythema nodosum in three cases. Rheumatic pains and fever of moderate type were usually associated with the eruption. Treatment consisted of salines, salicylate of quinin, anodynes, and applications for the eruption. Twice has he noted arterial and venous thrombosis, in one case resulting fatally. Post-typhoid abscesses he has noted on the legs, arms, and body in a small lad. They were associated with a suppurative parotitis on the right side. Of the affections of the nervous system he has seen in several instances absolute speechlessness, with melancholia and the involuntary escape of feces and urine. One of these patients committed suicide while in this condition.

THE TREATMENT OF MALIGNANT TUMORS BY THE TOXIN OF ERYSIPELAS

was the title of a paper read by DR. JOHN B. ROBERTS, of Philadelphia, which appears in the present issue of THE MEDICAL NEWS.

DR. JAMES TYSON, of Philadelphia, read a paper on THE TREATMENT OF TYPHOID FEVER BY THE BRAND METHOD.

Under the use of the Brand method of treatment the mortality of typhoid fever has been markedly dimin-

ished. At the Johns Hopkins Hospital, under Osler, the mortality is now but 7 $\frac{1}{2}$ per cent, as contrasted with from 10 to 15 per cent. under other methods of treatment. Dr. Tyson does not wish to make an absolute diagnosis, but just as soon as typhoid fever is suspected he at once uses the bath. The bladder is emptied, the skin, if moist, is dried, and the patient then gets into the bath himself and an ice-cap is placed upon his head. He is kept in the bath for fifteen minutes, being briskly rubbed everywhere except over the abdomen. He is then wrapped in a blanket and dried. In three-quarters of an hour the temperature is again taken, and if the thermometer registers 102.2° the bath is again given. The heart and pulse, instead of being weakened by the process, are strengthened. Respiration also becomes deeper and stronger. In thirty-four cases so treated he has had but one death, giving a mortality of 6 per cent. Professor J. C. Wilson has treated by this method sixty-four cases without a single death.

DR. BENJAMIN LEE, of Philadelphia, in his paper on

THE EMOTIONAL BRAIN,

stated that he considered the popularity of *Trilby* as due to the fact that the story is a series of flash-light photographs of living beings and scenes. It is true in details and is not mawkish. Every human being has his brains—namely, a thinking or rational and a feeling or emotional brain, the former situated in the cranium, the latter in the abdomen (the Biblical "bowels of compassion"), the solar plexus.

DR. CHARLES P. NOBLE, of Philadelphia, read a paper on

MOVABLE KIDNEY.

He stated that about one-fourth of his patients suffer from movable kidney, therefore he regards it as quite a common condition. The right kidney is invariably the one that is displaced, though occasionally both are involved; he has never seen the left organ alone displaced. The patients are usually thin. He has seen only one exception to this law, and that was a woman with a pendulous abdomen. The condition occurs among the rich and poor alike. The reflex symptoms that accompany the condition are occasionally general, but are usually only abdominal. There is bloating, distention of the bowels, cardialgia, and palpitation. The local symptoms vary in degree. Severe pain is not frequent, though occasionally noted. Acute strangulation from torsion has been reported, but this is rare. In many cases there are absolutely no symptoms. Variations in the quantity of urine voided during the twenty-four hours are due to twisting of the ureter. What is the normal position of the kidneys? The standard text-books on anatomy differ in their statements. In three-fourths of Noble's cases neither kidney extended below the ribs, therefore they could not be felt. He concludes that this must, therefore, be the usual position, and not down in the flanks. To discover them the patient must be examined while standing and bending forward, resting the hands upon the table, and expiring normally. The left hand of the examiner is placed upon the lumbar region and the right upon the abdomen opposite. The rest-cure is only of service in the slightly movable cases. Nephrorrhaphy is simple, rapid, and satisfactory. He has performed the operation in six cases. In one-tenth of his

cases he finds both kidneys movable. The patient cannot lie upon the side opposite to the movable kidney. His method of operating is to cut down in the kidney through a lumbar incision, split the capsule, insert stitches through it and carry them through the lumbar muscles.

DR. H. G. McCORMICK, of Williamsport, presented a paper on

THE MANAGEMENT OF CASES OF TYPHOID FEVER.

The old teaching has been that typhoid fever is a self-limited disease, and no course of treatment will be able to abort it. This, he believes, is an error. He is in the habit of giving his patients calomel until the bowels are opened; at times he employs salts instead. Internally he employs guaiacol (four drops) and eucalyptol (eight drops) every two hours; a milk-diet, stimulus, and strychnin as required. The bowels are washed out for the purpose of cleanliness, to reduce the temperature, and to afford nourishment. One quart or three pints of ice-water may be injected for this purpose. A bath is given every day. Ergotol only is given for hemorrhage. He never uses morphin or opium in any form to control the bleeding. Large enemata of ice-water are given in addition to the ergotol. Transfusion is employed as required. His patients never suffer from tympanites. He has treated over three-hundred cases with guaiacol without any ill-effects.

In reply DR. SOLIS COHEN, of Philadelphia, remarked that taking the records of tens of thousands of cases it is true that typhoid fever will run a course of definite duration of from twenty-four to twenty-eight days. He prefers salol as an antiseptic agent, and the only patient he has lost in two years was treated by guaiacol. He heartily favors the use of water. In case of hemorrhage he would always use opium. The danger of tympanites thus produced is nothing when compared to the danger of loosening of the clots in the bowels. He considers the Brand treatment the best of all methods of treatment for typhoid fever.

DR. I. C. GABLE, of York, has used guaiacol and carbonate of guaiacol in typhoid fever. Guaiacol itself often upsets the stomach, while the carbonate in doses of from five to ten grains every four hours is well borne.

DR. A. P. HULL, of Montgomery Station, read a paper on

THE ANTISEPTIC TREATMENT OF TYPHOID FEVER BY GUAIACOL.

The great question in the treatment of typhoid fever is, What can we do to reduce the mortality? In the treatment of his cases he is accustomed to use guaiacol, from $\frac{1}{4}$ to $\frac{1}{2}$ a drop, with $\frac{1}{16}$ grain of calomel until slight purgation is produced. He then washes out the bowels with large douches of water. The temperature is controlled by the external application of guaiacol, which acts in about twenty minutes and lasts for from three to four hours. Ten drops is the largest dose thus used. Larger doses are liable to produce a chill. The abdomen is first washed, and then guaiacol is dropped on and rubbed in, and the spot is covered with oiled silk. He has treated eleven cases in this manner, all recovering.

DR. KENIG, of Allegheny, stated that he was a thorough advocate of the antiseptic treatment of typhoid

fever. Guaiacol probably causes less production of the ptomaines of the bacillus, and thus renders the latter less harmful.

The paper of DR. JOHN H. PACKARD, of Philadelphia, was entitled

LIGATION OF ARTERIES IN THE TREATMENT OF MALIGNANT DISEASE.

In malignant disease of the mouth and surrounding parts the patient frequently suffers from septic pneumonia from the inhalation of particles of the morbid growth. After ligation of the arteries the diseased tissues may be curetted away. If, in doing this, a large arterial trunk be wounded, he would tie it with as little concern as he would a smaller trunk. He finds that collateral circulation is readily established. Some relief follows in a certain proportion of the cases so operated upon, but the results are not brilliant. Dercum reports a case of brain-tumor in which after ligation of the common carotid artery the patient had some relief of the symptoms.

(To be concluded.)

NEWS ITEMS.

The American Laryngological Association will hold its seventeenth annual session at Rochester, N. Y., in the Chamber of Commerce, June 17, 18, and 19, 1895. The profession is cordially invited to attend.

The following papers will be read: President's Address, by John O. Roe; Foreign Bodies in the Esophagus, by Harrison Allen; Desiccated Thyroids in Goitre, by E. Fletcher Ingalls; The Influence of Chronic Diseases of the Throat upon Certain Defects of Speech, by D. Bryson Delavan; Electrolysis by a Current Controller for the Reduction of Spurs of the Nasal Septum, by W. E. Casselberry; Is Acute Tonsillitis in Any Way Dependent upon the Rheumatic Diathesis? by George B. Hope. *a.* Some Remarks on Removal of the Tonsils; *b.* A Case of Lipoma of the Larynx, by J. W. Farlow. *a.* A Case of Melancholia Cured by Intranasal Operation. *b.* A Case of Suppurative Ethmoid Disease, Followed by Invasion of Sphenoidal Sinus, Abscess of the Brain, and Death, by F. H. Bosworth. A Consideration of Some of the More Important Principles of Intra-nasal Surgery, by W. K. Simpson; Ludwig's Angina, by J. E. Newcomb; Discussion. Tuberculosis of the Upper Air-passages: Etiology by Jonathan Wright, Diagnosis, by C. C. Rice, Treatment by E. L. Shurly and J. W. Gleitsmann; Cyst of the Maxillary Sinus, by Charles H. Knight; A Case of Abscess of the Frontal, Ethmoidal, and Maxillary Sinuses, by J. H. Bryan. *a.* Necrosis of the Middle Turbinate; *b.* Congenital Osseous Stenosis of the Naris, by A. B. Thrasher. *a.* A Naso-pharyngeal Cyst; *b.* An Oro-pharyngeal Cyst; *c.* Fibroma Papillare, or True Papilloma, of Nasal Septum, by Jonathan Wright; Discussion. The Relation of Vasomotor Disturbances to Diseases of the Upper Air-tract, by F. H. Bosworth, W. H. Daly, and J. N. Mackenzie.

DR. OSCAR H. ALLIS has been awarded the S. D. Gross Prize of \$1000 for an essay entitled "An Inquiry into the Difficulties Encountered in the Reduction of Dislocation of the Hip."

Meetings of State, National, and International Medical Societies:

	Meets.	Next meeting.
American Climatological Association.	June 13-15	Hot Springs, Va.
American Dermatological Association.	Sept. 17, 1895	Montreal, Can.
American Electro-Therapeutic Association.	Sept. 3, 1895	Toronto, Can.
American Microscopical Society.	August 21-23, 1895	Ithaca, N. Y.
American Neurological Association.	June 5-7, 1895	Boston, Mass.
American Ophthalmological Society.	July 24, 1895	New London, Conn.
American Orthopedic Association.	Sept. 19-21, 1895	Chicago, Ill.
British Medical Association.	July 30-Aug. 2, 1895	London, England.
Canadian Medical Association.	Aug. 28-30, 1895	Kingston, Ont.
Colorado State Medical Society.	June 18-20, 1895	Denver, Col.
Idaho State Medical Society.	Sept. 9-11, 1895	Boise City, Id.
International Congress of Dermatology.	August 4-8, 1895	London, Eng.
International Congress of Gynecology & Obstetrics.	September, 1895	Geneva, Switzerland.
International Congress of Hydrobalneotherapy.	1895	Ostend.
International Medical Congress.	August, 1896	Moscow, Russia.
Kentucky State Medical Society.	June 12-14, 1895	Harrodsburg, Ky.
Maine Medical Association.	June 5, 1895	Portland, Me.
Massachusetts Medical Society.	June 11, 12, 1895	Boston, Mass.
Medical Society of Delaware.	June 11, 1895	Wilmington, Del.
Medical Society of the State of New Jersey.	June 25, 26, 1895	Cape May, N. J.
Medical Society of the State of New York.	Jan. 28, 1896	Albany, N. Y.
Medical Society of Virginia.	October	Wytheville, Va.
Medical Society of West Virginia.	June 26-28, 1895	Davis, W. Va.
Michigan State Medical Society.	June 4, 1895	Bay City, Mich.
Mississippi Valley Medical Association.	September 3-6	Detroit, Mich.
New Mexico Medical Society.	July 10, 1895	Las Vegas, N. M.
New York State Medical Association.	October 15-17	New York City
Ontario Medical Association.	June 5-6, 1895	Toronto, Ont.
Oregon State Medical Society.	June, 1895	Portland, Ore.
Rhode Island Medical Society.	June 6, 1895	Providence, R. I.
Vermont State Medical Society.	October 10, 11	Burlington, Vt.
Wisconsin State Medical Society.	June 19-21, 1895	Superior, Wis.

The American Electro-therapeutic Association, through its Standing Committee on Electrodes, has addressed a circular-letter to every accessible manufacturer of electro-therapeutic apparatus, with the view of obtaining their co-operation in securing the general adoption of:

I. Uniform connections and interchangeable electrodes: 1. Universal rheophore tip. 2. Universal aperture for same. 3. Universal attachment for electrolysis needles, etc.

II. Standard gauge of screw throughout construction, should screws be desired.

The committee was also instructed to request manu-

facturers to submit to it the various forms of electrodes now on the market; to test the same, and to report at the meeting of the Society to be held in Toronto during September, 1895.

Descriptions of gynecologic electrodes will be received by Dr. Lucy Hall Brown, of Brooklyn, N. Y.; of neurologic electrodes, by Dr. C. Eugene Riggs, of St. Paul, Minn.; of surgical electrodes and others not specified, with samples of rheophores, rheophore tips, sockets, and other connections, by Dr. Charles R. Dickson, of Toronto, Canada.

Meetings of Philadelphia Medical Societies:

	Meets.	Next meeting.
Academy of Surgery,	1st Monday of month, Oct.—June.	June 3
College of Physicians,	1st Wednesday of month, Sept.—June.	June 5
Section of Gynecology,	3d Thursday of month, Oct.—June.	June 20
Section of Ophthalmology,	3d Tuesday of month, Sept.—May.	Sept. 17
Section of Orthopedic Surgery,	3d Friday of month, Oct.—April.	Oct. 28
Section of Otology,	1st Tuesday of month, Oct.—May.	Oct. 1
Section of Surgery,	2d Friday of month, Oct.—May.	Oct. 11
County Medical Society,	2d and 4th Wednesdays of month, Sept.—June.	June 12
Neurological Society,	4th Monday of month, Oct.—April.	Oct. 18
Obstetrical Society,	1st Thursday of month, Sept.—June.	June 6
Pathological Society,	2d and 4th Thursdays of month, Sept.—June.	June 13

The Ontario Medical Association will hold its fifteenth annual meeting in the Council Buildings, corner Richmond and Bay Streets, Toronto, on June 5th and 6th. The program includes a large number of interesting papers and some special discussions.

The Craig Colony for Epileptics has had the sum of one-hundred-and-twenty-five-thousand dollars appropriated for its use during the coming year. The amount will be expended in getting the colony in condition to receive patients this fall.

Prof. Carl Thiersch, the distinguished surgeon and deviser of the method of skin-grafting that goes by his name, died at Leipsic on April 28th, at the age of seventy-three years.

Dr. Emil Noeggerath, distinguished for his investigations upon the subject of gonorrhea, and at one time Professor in the New York Medical College, died on May 3d at Wiesbaden.

Deputy-Surgeon John S. Billings, U. S. A., will upon his own request be placed upon the retired list next October. He has accepted the chair of hygiene in the University of Pennsylvania.

Dr. James C. Wilson, Professor of the Theory and Practice of Medicine in Jefferson Medical College, has been elected physician to the Pennsylvania Hospital.